

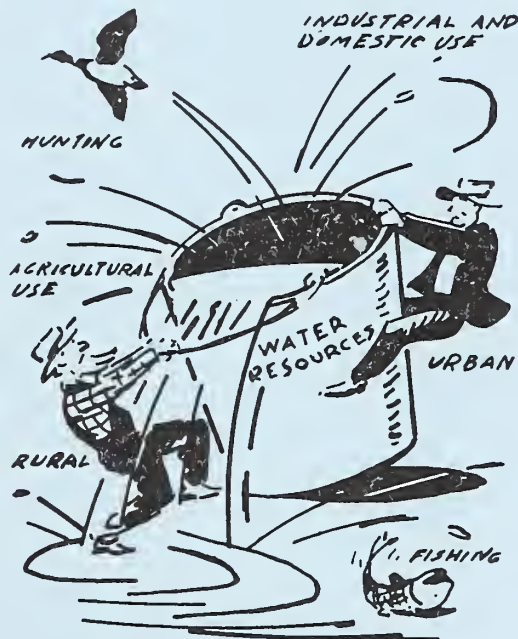
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ENVIRONMENTAL IMPACT STATEMENT

McNAIRY - CYPRESS CREEK WATERSHED

McNAIRY COUNTY, TENNESSEE



U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SEPTEMBER 1975

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McNairy-Cypress Creek Watershed
McNairy County, Tennessee

FINAL ENVIRONMENTAL IMPACT STATEMENT

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Donald C. Bivens, State Conservationist
Soil Conservation Service

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Sponsoring Local Organizations

McNairy-Cypress Creek Watershed District
Rm. B-4, Courthouse Building
Selmer, Tennessee 38375

McNairy County Soil Conservation District
Rm. B-4, Courthouse Building Selmer, Tennessee 38375

McNairy County Quarterly Court
Courthouse Building
Selmer, Tennessee 38375

City of Selmer
Selmer, Tennessee 38375

City of Ramer
Ramer, Tennessee 38367

September 1975

PREPARED BY
UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
Nashville, Tennessee 37203

074381

USDA ENVIRONMENTAL IMPACT STATEMENT
McNairy-Cypress Creek Watershed Project
McNairy County
Tennessee
Prepared in Accordance with Sec. 102(2)(C)
of P. L. 91-190

Summary Sheet

- I. Final
- II. Soil Conservation Service
- III. Administrative
- IV. Description of Project Purpose and Action: The sponsors' purpose is to improve the social and economic status of the watershed and surrounding area. This will be accomplished with land treatment and structural measures to reduce flood damages, erosion and sediment yield, and to provide water for industrial and recreational uses. A portion of Selmer, county seat of McNairy County, Tennessee, that is located in the flood plain will be protected from floodwaters.
- V. Summary of Environmental Impacts Including Favorable and Adverse Environmental Effects: Conservation land treatment impacts will be: (1) changing plant communities by decreasing cropland 7,410 acres and increasing grassland 3,150 acres and forest land 4,260 acres; (2) adding 74 miles of "edge" in croplands with contour stripcropping, grassed waterways, diversions, and field ditches; (3) initiating plant communities on 3,560 acres of barren gullied areas and 400 acres of roadbanks; (4) reducing sediment yield 11,740 tons per year; (5) reducing gross erosion by 364,000 tons per year; and (6) adding 84 farm ponds and 100 acres of food and cover for wildlife. Impacts of structural measures will be: (1) reducing sedimentation by 85 percent on 12,470 acres downstream from 20 impounding structures; (2) adding 958 acres of impounded water to the area with 230 acres for recreational and industrial use; (3) covering 958 acres of cropland, grassland, and forest land with water; (4) reducing flood damages by 59 percent on the flood plain and suspended sediment by 37 percent in the streams; and (5) low quality fish habitat along 4.78 miles of stream channel will be disturbed by channel work. Flood plain zoning will curtail construction of physical restrictions in the flood plain.

Adverse environmental effects that will occur are: (1) decrease of wildlife habitat resulting from land use change of crop or idle land to pasture; (2) loss or change of 2,265 acres of wildlife habitat; (3) loss of one barn and the modification or relocation of three bridges, 2,400 feet of paved road, and 4,600 feet of gravel road; (4) decreasing the quality of forest land waterfowl habitat in the flood plain; (5) decreasing the fish habitat quality by drift removal in the stream channel.

VI. List of Alternatives Considered:

- A. Acceleration of conservation land treatment.
- B. A levee system.
- C. Acceleration of conservation treatment and floodwater retarding structures.
- D. Acceleration of conservation land treatment and flood plain management.
- E. No project.

VII. Agencies and Other Sources from which Written Comments have been received:

Department of the Army
Department of the Interior
Environmental Protection Agency
Department of Transportation
Tennessee Office of Urban and
Federal Affairs (State
Clearinghouse)

Tennessee Conservation League
Wildlife Management Institute
Southwest Tennessee Development
District

VIII. Draft Statement received by CEQ on May 9, 1975.

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USDA SOIL CONSERVATION SERVICE
FINAL ENVIRONMENTAL IMPACT STATEMENT (1)*
for
McNairy-Cypress Creek Watershed
McNairy County, Tennessee

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83d Congress, 68 Stat. 666, as amended.

SPONSORING LOCAL ORGANIZATIONS

McNairy-Cypress Creek Watershed District, McNairy County Soil Conservation District, McNairy County Quarterly Court, City of Selmer, and City of Ramer.

PROJECT OBJECTIVES AND PURPOSES

The objectives of this project are:

- (1) to accelerate the rate of establishing soil and water conservation measures until at least 62 percent of the land is adequately treated.
- (2) to stabilize all critically eroding areas;
- (3) to reduce annual crop and pasture flood damage about 75 percent;
- (4) to meet the state fire loss index goal by continuing the increase in efficiency and effectiveness of fire control by the Tennessee Division of Forestry through the Cooperative Forest Fire Control Program;
- (5) to minimize damage to roads and bridges and minor fixed improvements;
- (6) to eliminate the damages along the fringe flood plain area in the urban area of Selmer from the 100-year frequency flood;
- (7) to increase the recreational opportunities;
- (8) to store water for future industrial use;
- (9) to maintain, where possible, the present fish and wildlife resources; and
- (10) to improve the environmental conditions of the watershed through critical area stabilization and farmland improvement under conservation management.

The purpose is to improve the social and economic status within the watershed and surrounding area.

*Unless otherwise stated, all data contained in this statement was developed by Soil Conservation Service and Forest Service.

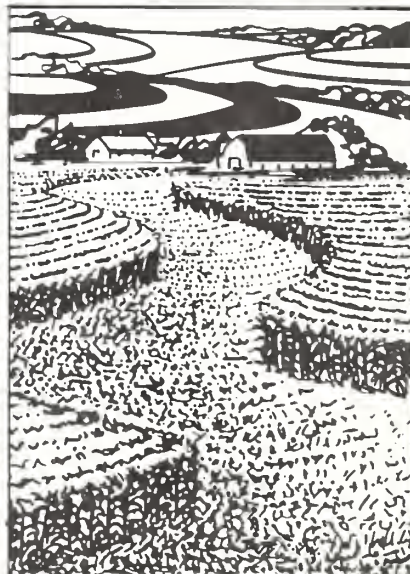
PLANNED PROJECT

Land Treatment

The conservation treatment on cropland includes 13,100 acres of conservation cropping systems, 3,200 acres of contour farming, 120 acres of stripcropping, 50 acres of grassed waterways, 115,000 feet of diversions, and 40,000 feet of surface field ditches with row arrangement.

A conservation cropping system is growing crops in combination with needed cultural and management measures that will keep the average annual soil loss within allowable limits or to maintain good soil physical condition (tilth). These systems will include crop rotations that contain grass and legumes, crop residue management, and cover crops. The cropping system can be made more intensive by using supporting conservation practices, such as contour farming or stripcropping. Contour farming is directing all the cultural operations across the slope or around the hill instead of up and down. Stripcropping is planting across the slope strips of crops alternated with strips of grass and legumes.

Waterways are low areas or depressions in hilly or rolling land where water accumulates to run off. These are established in grass to protect them from eroding. Diversions or surface field ditches are methods of collecting and safely removing excess water from flat farmland or sloping farmland with a water management problem. When row crops are grown on this flat land, they are arranged in such a manner so as to direct the excess water into the field ditches. The following sketch illustrates the appearance on the landscape of these practices:



A grassed waterway in place of the gully in the foreground with contour farming on the side. In the background of rolling land, contour stripcropping going around the hills instead of working the land up and down the hill.

The treatment of 3,450 acres of grassland will consist of: land use conversions and grass establishment on 1,750 acres of idle land or cropland; and the renovation of 1,700 acres of grassland. Eighty-four farm ponds will be constructed for better water distribution to improve pasture management.

Forest land treatment measures will consist of tree planting on 700 acres of idle land or open land; reforestation on 550 acres of understocked forest land and timber stand improvement on 500 acres of forest land. Although the present average annual burn exceeds both the state and watershed goals, improvement under the going program indicates that the desired reduction will be attained during the installation period without additional acceleration.

Critically eroding upland areas will be treated by establishing about 1,400 acres of perennial grasses and legumes and planting about 3,560 acres of trees. Due to the severe nature of some of these areas, about 250 debris basins will be built to trap sediment and help retarding runoff.

About 400 acres or 134 linear miles of roadbanks are critically eroding. These will be vegetated with suitable types of plants after necessary sloping and fertilizing. Mulching and protection will be included, where needed, in the site preparation plans. Wildlife habitat needs of food, cover, and water will be planned as a part of the land treatment program, including critically eroding areas.

Structural Measures

Twenty water impounding structures will be built. The primary purpose of all is floodwater retardation with sediment storage. One of the 20 will also provide the city of Selmer with industrial water and recreational water. Another of the 20 will supply Ramer with recreational water. The physical features of these measures are displayed in the chart on page 4.

The beneficial water pool of Structure No. 4 is 52 acres for recreation. This multiple-purpose structure will convert 144 acres from private to public ownership. In addition, 36 acres of flowage easements will be required. The beneficial pool of Structure No. 13 is 230 acres which will be used for recreation and industrial water. The industrial water will not be drawn below a 175-acre recreation pool. This multiple-purpose structure will require the purchase of about 428 acres which will change from private to public ownership. Eight acres of flowage easements will also be required.

The industrial water supply will be operated between Elev. 487.8 and 481.9 feet MSL. The shoreline deepening from 487.8 to 484.8 will prevent exposure of mudflats during this increment of drawdown. Further drawdown below 484.4 will expose some mudflats. The area and extent of exposure will depend upon the rate of drawdown and rainfall during this period.

PHYSICAL DESCRIPTION OF STRUCTURAL MEASURES
Floodwater Retarding Dams

Site Number	Purpose	Dam Height (Ft.)	Sediment Pool (Ac.)	Beneficial Pool (Ac.)	Temporary Retarding Pool**** (Ac.)	Construction Area* (Ac.)	Area Subject to Land Use Change***** (Ac.)
4	FP & Rec.**	26	24	52	113	25	138
5	FP	25	26	-	78	12	90
6	FP	19	54	-	115	12	127
9	FP	34	152	-	345	15	360
10	FP	28	50	-	113	12	125
11	FP	29	68	-	110	11	121
13	FP, Rec. & IWS***	47	91	230	291	17	308
14	FP	26	15	-	32	8	40
15	FP	28	32	-	62	12	74
16	FP	30	24	-	50	12	62
17	FP	29	13	-	33	9	42
18	FP	26	7	-	14	5	19
19	FP	26	18	-	52	10	62
23	FP	23	17	-	51	10	61
25	FP	25	19	-	58	10	68
28	FP	29	61	-	121	10	131
29	FP	28	42	-	90	10	100
30	FP	29	73	-	158	10	168
35	FP	22	29	-	71	10	81
36	FP	22	28	-	78	10	88
Total			843	282	2,035	230	2,265

* Construction area includes land needed for the dam, borrow area, and emergency spillway at each site.

** Flood prevention and recreation.

*** Flood prevention, recreation, and industrial water supply.

**** Includes area of sediment and beneficial pool.

***** Does not include 56 acres for basic recreational facilities.

In addition to the floodwater retarding structures, the plan proposed 4.78 miles of stream channel work for flood control. This segment of cleanout is in the lower end of Cypress Creek and is 3 percent of the total channel miles in the watershed and 60 percent of the length with perennial flow. The work will be confined to removal of sand deposits and drifts. Sand pumping will be the method of sand removal. About 32 acres of open land will be needed for a disposal area and 8.7 acres for the access-maintenance road.

The original plan proposed 24.6 miles of channel excavation, 6.6 miles of channel clearing and snagging, and 11.3 miles of on-farm ditching.

All floodwater retarding structures except Nos. 4 and 13 are designed with a gated orifice as an appurtenance to the principal spillway. This type orifice will permit fluctuation of the water levels in the pools to provide food-producing areas for migratory waterfowl feeding. The normal summer water level will be at the 50-year submerged sediment pool elevation, and the normal winter water level will be at the 100-year submerged pool elevation which covers an additional 220 acres of land. This winter pool will have a total water area in the project of about 958 acres (including the multiple-purpose structures) which will be suitable for waterfowl roosting and resting. The illustration on page 7 shows these conditions in a typical structure.

Mitigation measures for waterfowl habitat include about 10 miles of levees and about 15 water level control gates. It will not be necessary to construct all of this 10 miles of levees. The old spoil banks and natural levee now in place will provide most of the levee needed for the mitigation measure. Six areas shown on the project map will be leveed by filling openings in the existing spoil banks and equipped with water level control devices to maintain about 1,000 acres in a flooded condition during winter months. The water level control gates will permit draining of wooded or cultivated areas during the growing season and permit mosquito control or other management practices. Two gates may be needed on some of the larger areas to facilitate dewatering in the spring. Depth of flooding in these areas will be consistent with conditions that are desirable for waterfowl feeding and resting.

Additional areas, wherever material is available and agreeable to the landowners, will be developed by shaping the excavated spoil material into levees to provide seasonal flooding of cropland for waterfowl usage. A detailed study will be made prior to preparing final plans and specifications for stream channel work and mitigating measures.

These details will be formulated jointly by the engineer, biologist, sponsors, and landowners during the final design for construction.

All levees will be fertilized and sprigged or seeded with suitable vegetation. As many trees as possible, particularly mast bearing and large, beautiful trees, will be preserved.

A levee and water level control structure will be installed near Boles Branch to preserve the fish habitat of Howell Pond. The illustration on page 8 shows the levee and water control structure.

Pipe drop structures, excavated inlets, or other suitable grade control structures will be provided as needed for existing field drains, minor tributaries, and road drains. An estimated 20 pipe drop structures will be required. These structures will be used also where feasible to provide crossings for the channel maintenance road.

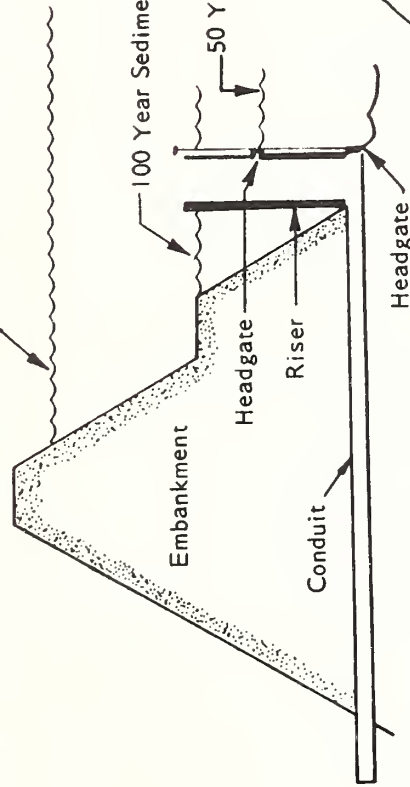
All construction areas (2,321 acres) will have erosion and sediment control measures planned and applied, utilizing the multiple-discipline approach. The construction contracts will include vegetative measures, structural measures such as sediment traps, and time of construction. Contractors will be required to adhere to strict contract guidelines for minimizing soil erosion and water and air pollution during construction. Structural measures will be installed to conform with health requirements, procedures, and regulations of the Tennessee Department of Public Health. If garbage or other debris is encountered, disposal will be in accordance with local and state regulations. Shoreline conditioning of pool areas will conform to state regulations for vector control. This will consist of deepening the shoreline to a depth of three feet. Other means of disposal may be used where practical, such as controlled burning in accordance with state air pollution regulations. Stumps and debris left will be buried below the normal ground level.

Water quality standards prescribed by the Tennessee Department of Public Health will be met and maintained by the industrial users of the water withdrawn from the impoundment.

The installation of the floodwater retarding structures will require the removal of one barn and the modification or relocation of three bridges, about 2,400 feet of paved road, and about 4,600 feet of gravel road.

If artifacts or other objects of historical or archaeological value are discovered during construction, the Tennessee Historical Commission, Tennessee Department of Conservation - Division of Archaeology, and the National Park Service will be notified.

Floodwater Detention Pool



100 Year Sediment Pool Level

50 Year Sediment Pool Level

Embankment

Headgate

Riser

Conduit

Headgate

Waterfowl Food Producing Area

100 Year Sediment Pool
(Winter) Level

50 Year Sediment Pool
(Summer) Level

Riser

Centerline of Dam

WATERFOWL FEEDING AREA BEHIND FLOODWATER RETARDING STRUCTURE

McNAIRY-CYPRESS CREEK WATERSHED
McNAIRY COUNTY, TENNESSEE

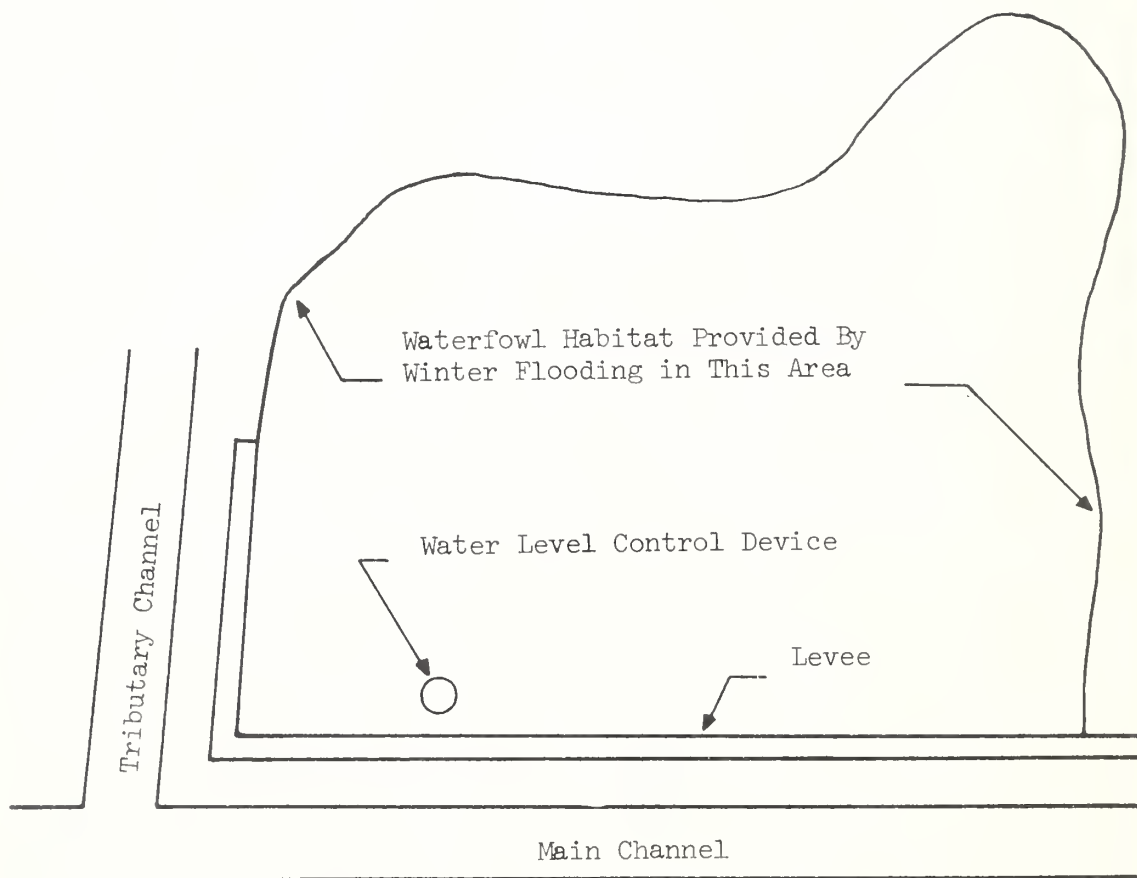
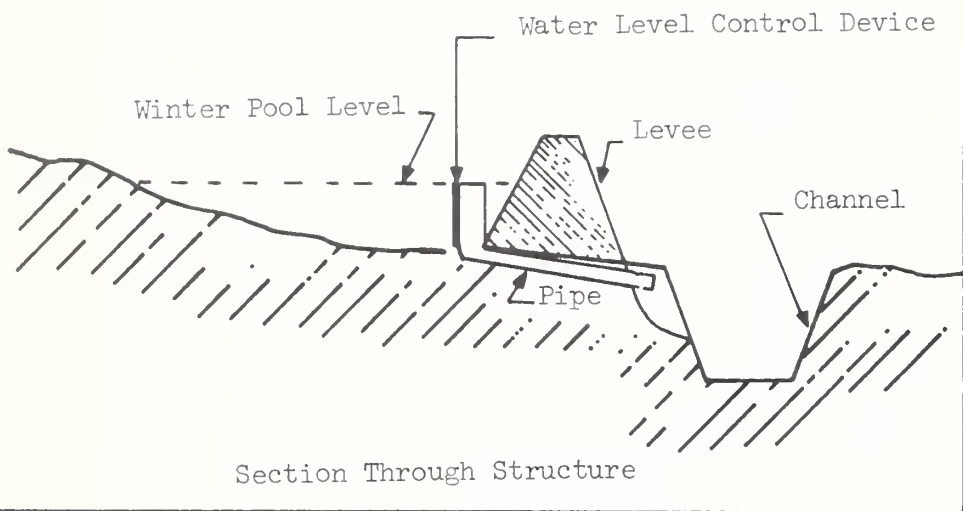


ILLUSTRATION OF STRUCTURE TO PROVIDE
AREAS OF WINTER HABITAT FOR WATERFOWL

Nonstructural Project Measures

A nonstructural project measure is flood plain zoning of a low-lying area not protected from the 100-year frequency storm in the city of Selmer. This is illustrated by the urban flood plain map of the city of Selmer, page 10. The 100-year flood line with and without the project is superimposed on the aerial photograph of Selmer.

Land Use Changes

Change of land use as a result of conservation land treatment will be converting about 1,750 acres of idle or cropland to permanent type pasture or hayland and about 700 acres idle or cropland to trees. The critically eroding areas will be converted to 1,400 acres of perennial grasses and legumes and to 3,560 acres of trees.

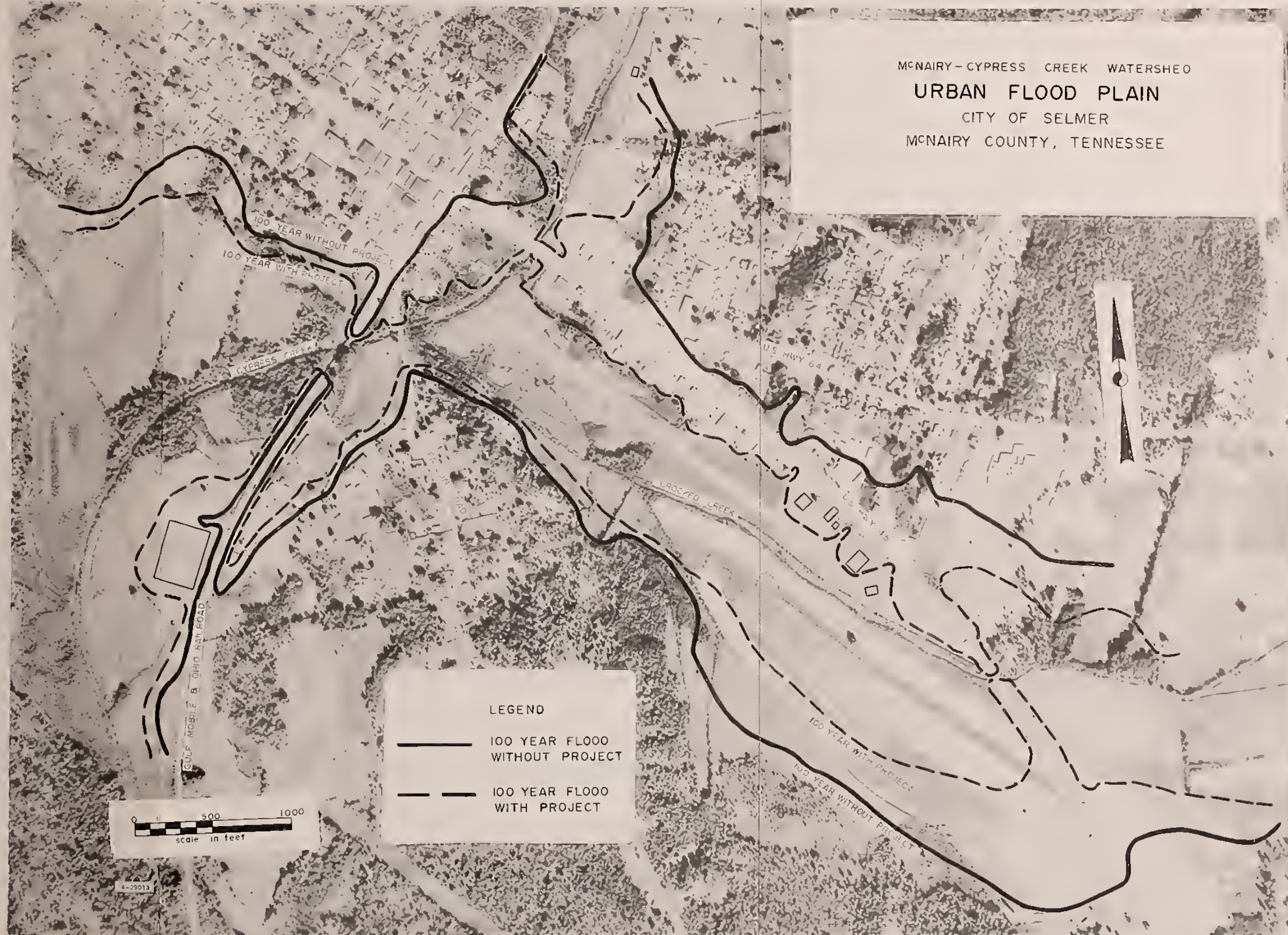
About 2,321 acres of land will be used for various purposes for the installation of the 18 floodwater retarding and two multiple-purpose structures in this project. This includes 230 for the dams and emergency spillways and borrow area, 958 for sediment and beneficial use pools, 1,077 acres in the temporary floodwater retarding pool areas, and 56 acres for the basic recreational facilities. This construction involves 1,029 acres of cropland, 200 acres of grassland, and 1,036 acres of forest land in the structures plus seven acres of grassland and 49 acres of forest land in the recreational facilities. No land use changes are planned for the flood plain except for those acres involved in the floodwater retarding structures and the 32 acres to be used for sand spoil area pumped from the channel and 8.7 acres for the access-maintenance road.

Operation and Maintenance

Land treatment measures applied on farms will be maintained by the landowners and operators at their own expense under cooperative agreement with the McNairy County Soil Conservation District. Forestry technical assistance to operate and maintain the forestry measures will be provided by the Tennessee Division of Forestry with the assistance of the U. S. Forest Service under the Cooperative Forest Management Program.

The McNairy-Cypress Creek Watershed District will be responsible for maintenance of all treatment of critically eroding areas. Most of the maintenance will be carried out by individual landowners. The maintenance applied will be such as periodic application of fertilizer and limestone, controlling obnoxious vegetation by mowing, assuring protection from overgrazing, keeping adequate vegetation on spillways of debris basins and protection from fire. Maintenance needed which is not carried out by the landowners will be performed by the Watershed District.

MCAIRY - CYPRESS CREEK WATERSHED
URBAN FLOOD PLAIN
CITY OF SELMER
MCAIRY COUNTY, TENNESSEE



The McNairy-Cypress Creek Watershed District will be responsible for adequately operating and maintaining the single-purpose floodwater retarding structures and the mitigation measures. This will include the removal of debris from the principal spillways; repair of fencing; keeping adequate vegetation on the dam and emergency spillway; restoring concrete that has deteriorated; restoring protective coating to gates, valves, and metal; and other repair of damage due to flood events or vandalism. Water level control gates will be closed in the fall to allow the water to rise in the structures to the 100-year sediment pool elevation to flood waterfowl food. No earlier than March 1 the following year, gates will be opened for the water level to recede to the 50-year pool elevation. This will allow waterfowl food producing plants to grow on the area exposed during the spring and summer. Shoreline deepening will be at the 50-year pool elevation to conform to vector control regulations.

The city of Selmer will be responsible for operating and maintaining multiple-purpose Structure No. 13 and the recreational development. The city will assure that the industrial water use does not lower the water level below that elevation designated for recreational use in the impoundment. If the need for additional industrial water occurs, the infringement will be negotiated between the city of Selmer and the Soil Conservation Service.

The city of Ramer will be responsible for operating and maintaining multiple-purpose Structure No. 4 with the recreational development. The principal spillway is equipped with a gate which will allow for fluctuating the water level for fish population management.

Operation and maintenance of these developments will include custodial policing, sanitation, safety, and other operational services and maintenance needs, plus replacement of deteriorated facilities. The developments will be operated and maintained in accordance with the regulations of the Tennessee Department of Public Health. The appropriate city may charge an admission or use fee to the recreational development provided such fees do not produce revenue in excess of the local costs required to amortize their initial investment and provide adequate operation and maintenance.

The McNairy-Cypress Creek Watershed District will be responsible for the operation and maintenance of the 4.78 miles of channel work. This will include regular inspections, reseeding significant areas of vegetation that have been destroyed, cutting or spraying undesirable trees and shrubs, removing and disposing of debris, adding riprap if needed, keeping access for maintenance in operable condition, restoring damaged pipe inlets from field or tributary outlets, and other items needed to insure stability and successful functioning.

Local sponsoring organizations will execute specific operation and maintenance agreements prior to obtaining federal financial assistance for land rights, facilities, or project agreements.

Project Costs

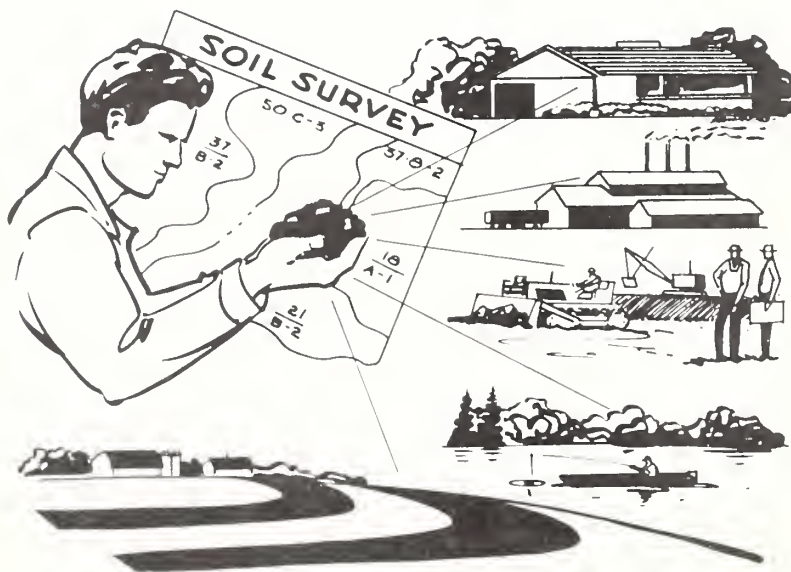
Project costs are shown in the following tabulation:

Item	PL-566 Cost	Other Federal Fund Cost*	Local Cost**	Total
Land Treatment	479,600	51,300	1,004,100	1,535,000
Structural Measures				
Construction	3,479,000		342,700	3,821,700
Other Costs***	1,413,900		1,140,100	2,554,200
Total Structural	4,892,900		1,483,000	6,375,900
Total Project	5,372,500	51,300	2,487,100	7,910,900

* Includes costs for technical assistance provided through federal funds other than PL-566.

** Includes costs provided by other than federal funds.

***Includes costs for engineering services, administration, and land rights.



ENVIRONMENTAL SETTING

The McNairy-Cypress Creek Watershed is about 80 miles east of Memphis, Tennessee, 35 miles southeast of Jackson, Tennessee, and 19 miles north of Corinth, Mississippi. It is located predominantly within McNairy County, in southwestern Tennessee, except for 400 acres in the northern part of Alcorn County in northeast Mississippi. Towns located within the watershed are Selmer, Bethel Springs, Ramer, and East View.

The watershed contains 110,000 acres with Cypress Creek as the main stream. It is a tributary of the Tuscumbia River and is within the Hatchie River Sub-Basin in the Lower Mississippi Water Resource Region (USDA 1970). (2)

The population of the watershed is 9,000 people. Fifty-four percent of the populace is urban, with 23 percent farm and 23 percent rural (USDC 1969). (3)

The soil and water resource problem areas are: 14,115 acres of bottom land subject to flooding, scouring, and sediment deposition; and 95,885 acres of upland which includes 4,960 acres of critically eroding and sediment producing areas, about 400 acres of critically eroding road-banks, and 18,350 acres requiring conservation treatment.

Soils in the watershed are classed into six major soil associations:

The Ruston-Lexington soil association, about 39 percent of the watershed, is found in the rolling and hilly area north of Oxford and Reedy Creeks. The hilltops are silty and the hillsides are sandy. The only significant level land is in the narrow first bottoms along the meandering creeks. Deep-cut active gullies are common in this area.

The Ruston-Cuthbert-Lexington soil association, about 6 percent of the watershed, occupies the area south of Reedy Creek and west of Cypress Creek. This area is moderately steep with long, narrow ridgetops. Silty layers cover the ridgetops, and sandy and clayey Coastal Plain material is exposed on the hillsides. Iron crust fragments can be found on the surface.

The Cuthbert-Ruston-Shubuta-Silerton soil association comprises about 29 percent of the watershed and can be found in the south-central part of the watershed, south of Oxford Creek and north of Indian Creek. The area is hilly with small fields (3-5 acres) on the ridgetops. The bottoms in this vicinity range from a few feet wide to about 100 yards. Severe erosion and deep-cut gullies are common.

The Boswell-Tippah-Oktibbeha-Shubuta soil association makes up about 8 percent of the watershed and is found east of Muddy and

Little Muddy Creeks. The topography is hilly with steep slopes along the drainageways. Most of the level land is in narrow strips in the bottoms.

The Ruston-Cuthbert soil association is about 3 percent of the watershed and is located south of Indian Creek. This is a hilly, steep, sandy area deeply dissected by drainageways.

The Falaya-Collins-Waverly soil association composes about 15 percent of the watershed area. These soils are found in the level flood plain of Cypress Creek and its many tributaries and are considered to range from moderately well drained to poorly drained. Areas of sand overwash (deposits) are common in this association.

The land capabilities in the flood plain are as follows:

<u>Capability Class</u>	<u>Percent Distribution</u>
I	9.1
IIw	69.6
IIIw	18.9
IVw	2.4

Capability classes indicate the degree of limitation in using the particular soil for field crops. The classes are designated by Roman numerals (I to VIII) which indicate progressively greater limitations and narrower choices for practical use.

Classes are subdivided into subclasses that identify a wetness limitation (w), erosion limitation (e), or other unfavorable soil features and adverse climate, such as drouthiness (s).

The watershed lies within the Mississippi Embayment Section of the Gulf Coastal Plain physiographic province. Geologic formations exposed in the watershed range in age from Cretaceous to Quaternary (Cushing et al. 1964). (4) A thin mantle of Pleistocene loess may be found in some areas of the watershed where it has not been lost by erosion. Surface soils vary in thickness from 4 to 42 inches.

The maximum relief is approximately 350 feet; however, the average difference in elevation from ridgetop to valley floor is about 100 feet.

The watershed has a warm, temperate, rainy climate and seasonal changes are gradual. The average annual precipitation is about 52 inches, is heaviest during winter and spring and is the lightest in the fall. Lack of rain during the growing season seldom causes crop failure, but it does reduce yields. Winters are generally short and mild with a few inches of snow. The average summer temperature is about 73.5⁰ Fahrenheit (F.). Temperatures as high as 106⁰F. and as low as -12⁰F. have been

recorded. Soils seldom freeze more than three inches deep and ordinarily thaw in five or six days. The average frost-free period, based on the Savannah Weather Bureau Station, is 206 days, from April 3 to October 26. The growing season is usually long enough to mature all crops common to the area (USDA 1941). (5)

Mineral resources in this watershed consist of clays of the McNairy sand used previously in the ceramic industry and sand and gravel which are used locally for road construction (Floyd 1965, Whitlack 1940). (6)

Ground water supplies are available within the watershed area. Aquifers from the Eutaw, Coffee, and Ripley formations have supplies with good chemical quality. The water supplies are calcium or sodium bicarbonate types; and iron is the most troublesome mineral constituent (Cushing et al. 1968, Hosman et al. 1968, Boswell et al. 1965). (7)

Present Land Use and Distribution by Soil and Water Resource Problem Areas in the Watershed

Land Use	Bottom Land (Flood Plain)		Upland		Total	
	Acres	Percent	Acres	Percent	Acres	Percent
Cropland	10,276	73	18,124	19	28,400	26
Pastureland	1,777	13	8,383	9	10,160	9
Forest land	1,465	10	63,835	66	65,300	59
Other	597	4	5,543	6	6,140	6
Total	14,115		95,885		110,000	
Percent	13		87		100	

The land use pattern in the uplands would be described as small crop fields on level ridges and narrow valley bottoms. Much of the acreage of the hillsides is in woods. Where farming operations have been done in the past with little regard to sound conservation practices, severe eroding gullies exist. Uplands in the lower half of the watershed are more heavily forested than those in the upper half.

Land use in the bottom land would be described as predominantly open land with relatively large crop fields. The major part of the bottom land forested acres would be in the downstream portion of the flood plain.

Cypress Creek, a warm water stream, has perennial flow from Highway 57 downstream to the Tuscumbia River (about eight miles), with a base flow of about two cubic feet per second (cfs) (USDA et al. 1968). (8) This is not from natural runoff or springs and seeps but from used water sources such as sewage treatment systems, laundries, and other places using large amounts of water. Selmer has now installed secondary sewage treatment facilities. Additional treatment capacity is also planned. The average flow is 5 cfs, 6.7 hydrogen ion concentration (pH), dissolved oxygen eight parts per million (ppm) (USDA et al. 1968). (8) Cypress Creek is classed as a manmade previously modified stream because of past channel modification programs (1911, 1915, and 1948). The stream use classification by the Tennessee Water Quality Control Board is for fish and aquatic life, irrigation, and livestock watering and wildlife (Tennessee Department of Public Health 1972). (9) Facts concerning concentration of fertilizers and insecticides are not known about this stream. However, McNairy-Cypress Creek Watershed is typical of watersheds in the coastal plain of West Tennessee. The conditions of geologic parent material, soils, topography, farming practices, techniques, crops, land use and problems are typical of watersheds in the Hatchie and Obion Basins. Recent sampling and testing in the Obion Basin should be closely related and indicative of those in Cypress Creek as far as agricultural problems are concerned. Testing in the Obion Basin shows no serious pesticide problems. (Data of file). The normal color of the stream water is light brown. The average annual suspended sediment concentration is calculated to be 288 milligram per liter. All the tributaries are intermittent.

According to the Horton classification system (Kuehne 1962) (10), Cypress Creek becomes a fourth-order stream at the junction with LaRue Branch which is in the floodwater retarding structure site No. 9. From the junction with Muddy Creek, Cypress Creek is a fifth-order stream to the confluence with Tuscumbia River. Muddy Creek is a fourth-order stream from the junction of Little Muddy Creek to its confluence with Cypress Creek.

Three impounded water areas are located in the extreme downstream reach of the watershed. Two of these areas, Howell Pond (27 acres) and Baldwin Pond, are old creek channels dammed by spoil from past channel construction. The third, Big Hill Pond (22 acres), was formed by construction of the Southern Railroad across the downstream part of the watershed. About 450 manmade farm ponds are in the watershed. At least 50 of the ponds are more than one acre surface area.

There are about 75 acres of wetland type 5 (open fresh water) in the downstream end of the watershed. These are the old oxbow areas that were created as discussed above (Howell Pond and Baldwin Pond). About 20 percent of the flood plain or 2,800 acres would be in wetland type 1 (seasonally flooded areas). Wetland types are described by USDI (1956). (11) These acres would be in land capability classes IIIw and IVw (see page 14).

Plant and Animal Resources

The stream fishery resources are low to negligible and are confined to the downstream half of the main stem of Cypress Creek (USDA et al. 1968). A 1963 study on Tusculumbia River found 284 pounds of fish per acre (Appendix B, Biology work group report). A study (Tennessee Wildlife Resources Agency and Mississippi Game and Fish Commission) in Muddy Creek (Hardeman County, Tennessee) showed 45 pounds of fish per acre. Cypress Creek fishery resources are comparable to these populations. The following fish species are listed in order of abundance in the sample: channel catfish, carp, bluegill, largemouth bass, redear sunfish, and warmouth.

The old creek channels dammed by past construction comprise a significant fishery in this project area. Fish population studies in this type water area in West Tennessee yielded up to 600 pounds per acre. About 75 acres of this type water exist in the watershed.

The flood plain in this watershed has two types of wetland habitat for waterfowl. The downstream end of the project provides most of the habitat. The oxbow lakes (wetland type 5, USDI 1956) (11) contribute to production of resident waterfowl while at least 2,800 seasonally flooded (wetland type 1) acres attract the migratory waterfowl. Wooded and idle land comprising between 15 and 30 percent of the flood plain adds to the holding ability of the area for waterfowl.

Other wildlife species in the area are the swamp and cottontail rabbit, squirrel, quail, and dove. A deer population exists, and hunting is reported to be a very popular activity. Some furbearers are harvested, but the volume is not known.

Sediment deposits filling the stream channels have definitely had an effect on the stream fisheries. Overbank deposition is also causing a change in terrestrial habitat quantity and quality either by causing timber to die or by flooding other areas that were not flooded previously.

The forest types in the watershed are: pine, 6 percent; pine-hardwood, 6 percent; hardwood-pine, 18 percent; and hardwood, 70 percent. The principal tree species are: loblolly and shortleaf pines, red cedar, white red post and blackjack oaks, hickory, blackgum and sweetgum, and flowering dogwood.

No rare or endangered species are reported to be in the project area.

Economic Resources

All land in the Cypress Creek Watershed is privately owned except for the state park land located on the right bank of the stream, downstream from VS-27 to the creek mouth. Cypress Creek Watershed comprises about 30 percent of the land in McNairy County.

The average size of the 700 farms in the watershed is about 150 acres, ranging from 10 to 800 acres. The average value, including fixed improvements is \$25,000. The land value in farm units ranges from \$125 to \$875 per acre; and the value of flood plain land ranges from \$150 to \$1,500 per acre.

The major crops produced in the watershed are cotton, corn, soybeans, silage, small grains, hay, and pasture. The major sources of agricultural income are: cotton (40 percent), livestock and livestock products (25 percent), cash grain (25 percent), and forestry products (10 percent) (USDC 1969). (3)

A network of federal, state, and county roads provide easy access to markets and business areas. Federal highways traverse the watershed area both north-south and east-west. Two railroads cross the watershed area; but only the Gulf, Mobile, and Ohio goes through Selmer and Ramer.

The economy of the area is almost exclusively dependent upon agriculture. During the past decade, the number of farms in McNairy County has decreased by about 50 percent, causing a drastic reduction in the number of employed agricultural workers (USDC 1954, 1959, 1964, 1969). (3) Many farmers work part-time in nearby towns and cities to increase their income level. About 420 of the 700 farms in the watershed are located in the flood plain area.

It is estimated that about 60 percent of the family-type farms are in the low income or economically depressed category. Data taken from the U. S. Census of Agriculture showing trends in the agricultural economy of McNairy County follow:

Item	Unit	1954	1959	1964	1969
No. of farms	No.	2540	1866	1491	1478
Average size of farms	Ac.	104	114	130	146
Average per ac. value of land & buildings	Dollars	42	63	104	153
Owners & part-owners operating farms	Percent	67	71	78	73
Proportion of tenancy	Percent	25	24	22	13
Part-time farmers	Percent	21	42	43	27
Commercial farms	No.	1884	1138	1061	1051
Class I	No.	0	0	6	10
Class II	No.	10	6	23	30
Class III	No.	181	40	101	92
Class IV	No.	497	147	266	182
Class V	No.	791	440	345	288
Class VI	No.	405	505	320	248

Employment characteristics of McNairy County show about 33 percent of the population in the labor force. The following table shows employment characteristics:

Item	YEAR			
	1940	1950	1960	(Aug.1969)
Total labor force	6340	6340	6351	5800
Total employed	6023	6175	5684	5520
Total unemployed	317	165	667	280
Percent of total labor force unemployed	5.0	2.6	10.5	4.8
Labor force as a percent of total population	31.0	31.0	35.0	33.0

Recreational Resources

The existing recreational opportunities in this watershed are limited primarily to hunting and fishing on privately owned land and waters (USDA et al. 1968). (8)

The summary of the recreation development potential in the county indicates a high rating for vacation cabins, cottages, and homesites and camping grounds. All other categories rated a medium except field sports areas, riding stables and miniature golf courses which rated low. These ratings do not reflect economic benefits of development, only the natural and manmade resources necessary for the initial potential analysis.

Tennessee State Department of Conservation has plans for future development of the Big Hill Pond area and Howell's Pond as a state park.

Sediment is the principal pollutant affecting water quality that will influence the recreation resources.

Public access to the stream below Selmer is considered fair but is good at the impounded oxbow lakes. Roads cross the main stream six times, and the railroad parallels it for about five miles and crosses it twice. From VS-27 to the mouth of the creek, access along the right bank of the stream is available through the state park land. Other than at these points, access is available only through private lands. The railroad fill forms the dam for Big Hill Pond, and access is available along the railroad right-of-way. There is an access road into Howell's Pond. Hunter access to farmland is usually granted.

Archaeological, Historical, and Unique Scenic Resources

The latest edition of the National Register of Historic Places does not list any site of historic interest in the watershed, and no sites are in the process of being nominated to the Register. Coordination with the Tennessee Historical Commission indicated no sites of historical significance. Detailed archaeological investigations are being carried out prior to implementation of the plan.

Soil, Water, and Plant Management Status

Some trends in land use changes are apparent. Row crops are being replaced by livestock and diversified farming to allow farmers to work part-time in towns and cities to supplement income. Inflated prices for some row crops, such as soybeans, have restored a number of acres of marginal and submarginal lands to crop production. Spring floods have frequently forced farmers in the flood plain to substitute a short-season or a replacement crop for a full-season crop. A longer-term trend is to manage this for soybeans or pasture in place of cotton and corn.

Overgrazing, burning, overcutting, and past cultivation of areas now in forest land are the major reasons for the poor hydrologic condition of the forest land in the watershed. There are no forest lands in the watershed that could be classed hydrologically as either good or very good. The present conditions on the 65,300 forested acres are: very poor, 56 percent; poor, 28 percent; and fair, 16 percent.

All land in the watershed is in either the McNairy Soil and Water Conservation District or the Northeast Mississippi Soil and Water Conservation District. Of the 700 farms, there are 400 district cooperators whose farms contain 50,000 acres. Conservation plans have been prepared on 140 of these farms, covering 20,000 acres. About 30 percent of the needed land conservation treatment has been applied by landowners and operators.

The Tennessee Division of Forestry, in cooperation with the U. S. Forest Service, through various federal-state cooperative forestry programs, is providing forest management assistance, forest fire prevention and suppression, distribution of planting stock, and forest pest control assistance to private landowners. Records indicate that 6,950 acres of trees have been planted during recent years which have helped stabilize some formerly gullied areas. The average percent burn for the years 1965 to 1970 on the forest lands in the watershed is 0.77 percent. The state fire loss index goal and watershed protection goal is 0.25 percent. Implementation of the state fire control program has reduced this rate to 0.01 percent during the years 1970 to 1975. Continuation of this program will maintain the rate within the state goal.

Estimates indicate that about 25,000 acres of the watershed have been field mapped by the Soil Conservation Service. A complete soil survey will be available in the future for use in resource conservation planning.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land and Water Management

There is a need to develop conservation plans on the remaining 560 farms which constitute 80 percent of the watershed. These plans would provide for land use changes and conservation treatment of 20,000 acres. Plans would be developed utilizing the soils capability system and soil loss tolerance equations as guides.

Application of land use changes and conservation practices have been low because of economic conditions, lack of information and education about resource conservation, inadequate amounts of technical assistance, and the lack of incentives to apply conservation measures. The poor status of land and water management is shown by the following summary of upland adequately treated:

<u>Land Use</u>	<u>Total Acres</u>	<u>Adequately Treated</u>	<u>Percent Adequately Treated</u>
Cropland	18,124	4,900	27
Grassland	8,383	2,010	24
Forest Land	63,835	10,000	16
Other	<u>5,543</u>	<u>Not Known</u>	<u>--</u>
Total	95,885	16,910	18

It is estimated that 7,410 acres of upland cropland need to be changed to a less intensive use. This includes 4,960 acres of critically eroding lands that are predominantly gullies. An additional 2,450 acres of land are idle, causing sheet erosion, and need converting to grass or trees. The severe erosion on these areas has exposed a layer of soil that is infertile and highly susceptible to continued erosion. The lack of adequate vegetative cover has increased the rainfall runoff and rate of erosion, as well as depressing the economic returns.

A general lack of management is evident in the forest land as evident by 56 percent of the forest being classified as having a very poor hydrologic condition, 28 percent poor, and 16 percent fair. These poor hydrologic conditions were caused by overgrazing, excessive burning, overcutting, and past cultivation of lands now forested.

Economic conditions of the rural sectors of the watershed are poor with an estimated 60 percent of the farms in a low-income or economically depressed category. The need for income to meet basic necessities of life prevents the use of economic resources in making long-run adjustments or applying conservation measures that do not have immediate impact on production. Farms are small (146 acres), thus prohibiting the purchase of adequate equipment and the use of more advanced technology. High market prices for some crops, like soybeans, have kept landowners trying to crop marginal fields, thus adding to the problems of erosion, sedimentation, runoff, and depressed economic conditions.

Floodwater Damage

About 14,115 acres of bottom land are subject to flooding from Cypress Creek and its tributaries. The frequent spring floods are the primary flood problems to the farmers. Replanting after these floods requires additional work and expense to prepare a new seedbed. Uneven crop stands also contribute to decreased net farm income. Under present flooding conditions, landowners are experiencing 21 to 26 percent loss on cropland and 18 percent loss on pasture. No apparent loss from floodwater occurs on forest land.

The flood hazard area includes urban areas and prime agricultural land. There are 39 residences, 75 businesses, four industries, two schools, one post office, and one city park in the urban area subject to flooding. Cropland subject to flooding includes 1,778 acres of cotton, 4,033 acres of corn, and 4,465 acres of soybeans. There are 1,777 acres of pasture in the flood hazard area. The total number of landowners is about 420.

The average annual flood damage under present conditions is \$541,100. The damage to crops and pasture is approximately \$297,400; roads and bridges, \$46,800; other agriculture, \$12,400; sediment, \$44,600; indirect, \$62,400; and urban property, \$77,500. The price of flood plain land is depressed due to the flood hazard. The present value ranges from \$150 to \$1,500 per acre.

A 25-year frequency storm occurred April 29 and 30, 1963. This was the largest storm recorded during the past 20-year period. As reported by the McNairy County news media, the rainfall was unofficially recorded at 4.75 inches. About 13,280 acres of bottom land were flooded by this storm, and 27 road bridges were washed out. The highway and grounds of the Selmer Elementary School were covered by six inches of floodwater.

The lives of people in the hazard area would be affected by a 25-year frequency storm. It would cause the sewage treatment plant at Selmer to become inoperative, require repair of motors, and cause a disruption of electrical and phone services. Other less obvious effects would be employment disrupted; industrial and agricultural production altered; sale of products interrupted; and traffic, school bus, and mail delivery delayed. A recurrence of this size flood would cause an estimated 1.3 million dollars of damage to residential, commercial, and industrial property in the city of Selmer.

Erosion Damage

The gross erosion rates are estimated for the various conditions in the watershed and tabulated as follows:

<u>Land Use or Condition</u>	<u>Tons/Acre-Year</u>
Cultivated Land	9 to 17
Idle Land (critically eroding areas)	10 to 18
Pasture	2 to 8
Forests	1.2 to 1.5
Gully Areas	207
Streambanks	210
Roadbanks	210

Critically eroding areas and gully areas are illustrated and located on the Problem Location Map, page 24. About 4,960 acres of land are voided by severe gullies. About 400 acres of roadbanks are considered critically eroding areas, adding to the problem of sedimentation. Flood plain scour has reduced the productive capacity of 185 acres by about 35 percent.

Sediment Damage

Infertile sandy coastal plain materials erode from the upland and are deposited on fertile flood plain and in the streams. The productive capacity on about 3,000 acres has been reduced by 30 percent by overbank deposition of these coarse-grained sands. The same type sediments are being deposited on forest lands, especially downstream from Tennessee State Highway 57. Spoil material from previous channel work, placed adjacent to the streams, impedes the return of floodwater into the stream. This condition, along with the constant settling of bedload material in the flood plain, has caused 240 acres of bottom land to become idle since 1940. Dead timber stands are common in places the local people call "swamped out" which is a stage of transition to a more water tolerant plant community.

The average annual suspended sediment concentration is estimated to be 288 milligrams per liter. The average annual sediment yield for the watershed is 87,036 tons; and 80 percent is considered suspended material. The average annual damage value is \$44,600.

Drainage Problems

Sediment in the main channels has resulted in clogged on-farm drainage ditches and road drainage ditches in the flood plain. This condition adds to the maintenance costs of both private landowners and the public.

Municipal and Industrial Problems

The present water requirements have been met by the city of Selmer. Studies made by consultants representing the city indicate a need for additional water storage or supply. The city of Ramer presently has an adequate community water supply.



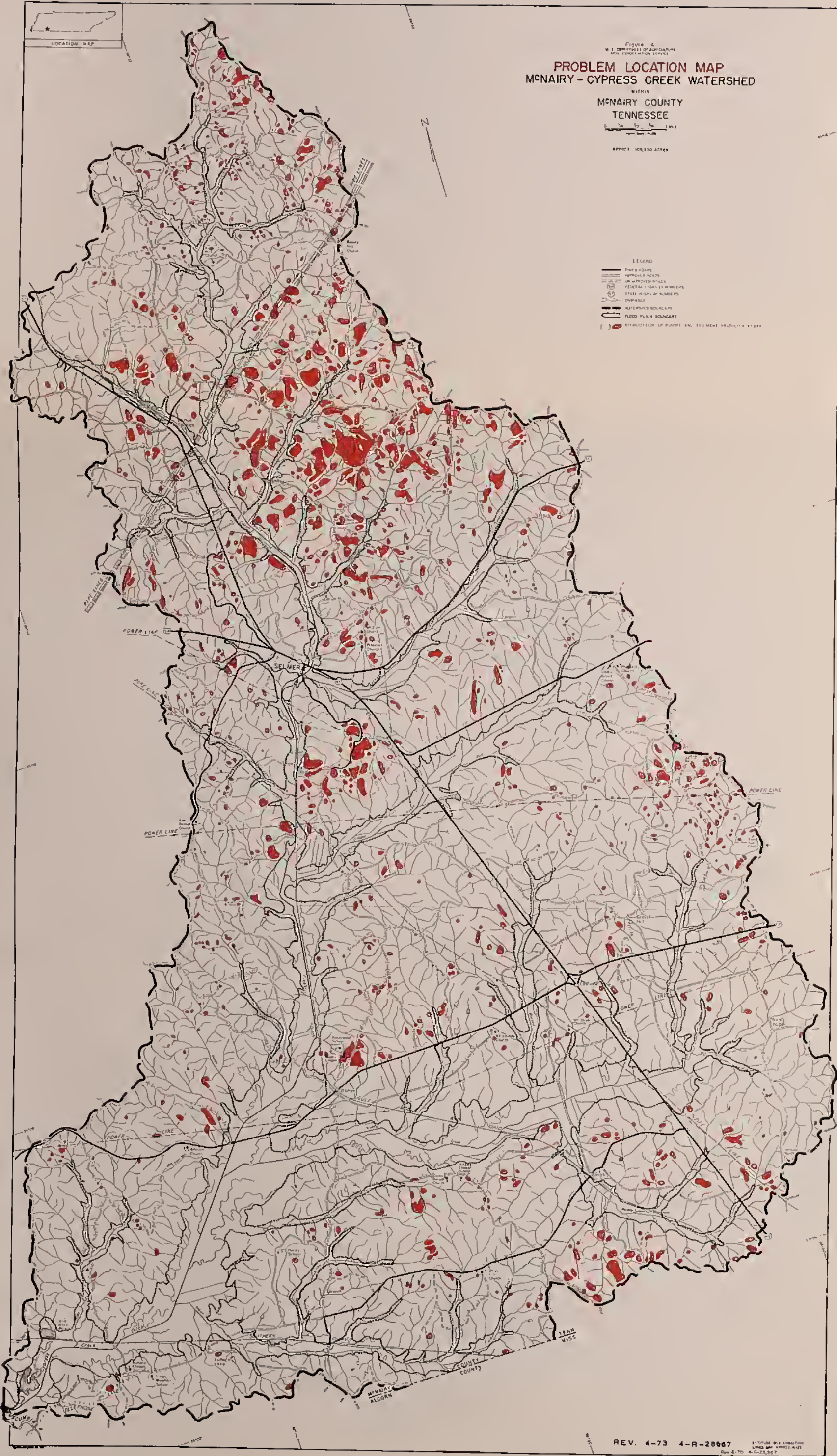
Figure 4
N. I. DEPARTMENT OF AGRICULTURE
NATIONAL CONSERVATION SERVICE

PROBLEM LOCATION MAP MCNAIRY - CYPRESS CREEK WATERSHED

WITHIN
MCNAIRY COUNTY
TENNESSEE

Scale: 1 inch = 1 mile
Scale: 1 inch = 1.609 kilometers
Scale: 1 inch = 1.609 kilometers

- LEGEND
- PAVED ROADS
 - UNPAVED ROADS
 - UNIMPROVED ROADS
 - FEDERAL HIGHWAYS
 - STATE HIGHWAYS
 - RAILROADS
 - WATERWAYS
 - WATERWAY BOUNDARY
 - FLOOD PLAIN BOUNDARY
 - WATERSHED BOUNDARY
 - WATERSHED BOUNDARY
 - WATERSHED BOUNDARY



Recreation Problems

According to the Tennessee Department of Conservation Statewide Comprehensive Outdoor Recreation Plan (TDC 1972) (12), there is a shortage of water-based recreational facilities and parks in West Tennessee. This shortage, plus the close proximity of metropolitan urban centers, shows a need for new developments for local as well as regional users.

Plant and Animal Resource Problems

Open "clean tilled" crop fields are common in all the uplands and in the flood plain downstream to Selmer. While contributing to some game species habitat, such as dove, large fields tend to limit habitat for other wildlife species, such as rabbit and quail.

The high sediment yield is constantly changing the water quality in the stream, changing the fisheries habitat by filling in pools, and influencing the fish population by reducing the production of fish food organisms and fish. Sedimentation is also killing timber, changing waterfowl habitat, and generally altering the terrestrial habitat of all species in the flood plain.

Economic and Social Problems

The Overall Economic Development Program for McNairy County, Tennessee, dated 1962, shows the following factors as contributing to the lack of economic development in the county: shrinking agricultural economy, lack of venture capital, competition, labor force with limited skills, underdeveloped human and natural resources, outmigration of young people, poor woodland management, and no coordinated effort for economic development.

Agriculture remains the principal industry in the county. It is estimated that about 60 percent of the family-type farms are in low-income or economically depressed categories (TDES 1969). (13) During the past decade, the number of farms in McNairy County has decreased by about 50 percent, causing a drastic reduction in the number of employed agricultural workers (USDC 1954, 1959, 1964, 1969). (3) Many farmers work part-time in nearby towns and cities to increase their income level. The present labor force, employed by industry, is about 80 percent women and 20 percent men. Statistics indicate that the proportion of farm tenancy is decreasing from 29 percent in 1950 to 13 percent in 1969; that part-time farmers are increasing from 14 percent in 1950 to 27 percent in 1969 (it was 43 percent in 1964). Owners and part-owners have also increased during this same period, from 64 percent to 73 percent (USDC 1954, 1959, 1964, 1969). (3)

A health hazard plagues the community of Selmer after each major flood. A flood larger than a 25-year frequency flood would require the care and evacuation of many people from the flooded area. This could be accompanied by physical and mental stresses of people involved, leading to physical and mental illnesses.

Local residents of the area are handicapped by the lack of public water-related recreational facilities to be able to make full use and enjoyment of their leisure time.



ENVIRONMENTAL IMPACTS

Conservation Land Treatment

1. Changed land use in the upland due to the project land treatment program will result in a decrease of 7,410 acres of cropland but will increase grassland by 3,150 acres and forest land by 4,260 acres.
2. Seventy-four miles of "edge" between different vegetation types will be created in cropland areas by the establishment of the conservation treatment practices of contour strip cropping, grassed waterways, diversions, and surface field ditches.
3. The wide variety of plant species found on idle land or the monoculture of seed producers on cropland will be changed to a semi-monoculture of grasses and legumes on the pastures by the conversion of 3,150 acres of idle land or cropland to grassland.
4. Land adequately treated in the watershed (used within its capability and meeting the acceptable soil loss factors) as a result of the land treatment program will be as follows:

	Unit	Watershed Needs	Presently Treated	Acres to be Adequately Treated	Acres Remain- ing
Cropland	Acre	26,900	5,090	13,100	8,710
Pastureland	Acre	10,324	2,010	3,450	4,864
Forest Land	Acre	61,688	10,000	1,750	49,938
Other Land	Acre	5,143	135	50	4,958
Critical Area Stabilization		5,060			
Tree Planting	Acre			3,560	0
Critical Area Vegetation	Acre			1,500	0
Roadbank Stabilization	Acre	400		400	0
Debris Basins	Each			250	0
Total		109,515	17,235	23,810	68,470

*For additional data see Table 1 and 1A, pages 89-90, of the plan.

5. Average annual sediment yield for the watershed will be reduced from 87,036 tons to 75,296 tons.
6. Water and additional diversity of plant species in the grassland will be provided by the 84 farm ponds that will be constructed.

7. Additional tree species will be added to the diversity of plants that will be growing on the 700 acres of idle land or cropland to be planted. However, as the trees that are planted become dominant, the initial species diversity will decrease to a relatively small number. The reforestation of 550 acres of understocked forest land and the 500 acres of timber stand improvement will ultimately cause a decrease in plant communities.
8. Total gross erosion will be reduced by land treatment from 871,000 tons per year to 507,000 tons per year, a net reduction of 364,000 tons or 42 percent. Sedimentation will be reduced in Cypress Creek and Tuscumbia River as a result of the land treatment. Land treatment will reduce upland sheet erosion by 17 percent, gully erosion by 69 percent, and roadbank erosion by 65 percent.
9. Plant communities will be established on 3,560 acres of critically eroding uplands. These areas are generally devoid of plants, and the planting of trees and grasses will stabilize the erosion and restore some fertility to support the invasion of other plants.
10. The average annual floodwater damage reduction due to land treatment is estimated to be about 10 percent or \$54,100.
11. Plant communities will be established on the 400 acres of denuded roadbanks. A wide diversity of plant species will develop as a result of the plantings plus the invading native species resulting from the increased fertility that will be applied in the process of establishment.
12. The appearance of 23,760 acres of land will be more pleasing to the eyes of the public through the installation of the land treatment measures, which will generally increase and diversify ground cover and eliminate ugly areas due to accelerated erosion.
13. One hundred acres of food and cover plantings for wildlife will be made in field borders.

Structural Measures

1. Deposits of sediment on 12,470 acres of flood plain land will be reduced by 85 percent by the 20 impounding structures. This will also cause a further reduction of sediment in Cypress Creek and Tuscumbia River.
2. The watershed area will have 958 surface acres (winter pool) of impounded water within its boundaries provided by the 20 impoundments. Two hundred twenty-seven surface acres will be for recreational use, and 230 surface acres for industrial use.

3. Nine hundred and fifty-eight acres of wetland habitat for waterfowl will be made by the 20 structures. The summer drawdown of the sediment pools will furnish 220 acres of food-producing area and will be within the 958 acres of water for roosting and resting.
4. Seven hundred thirty-eight surface acres (958 acres winter pool) of standing water (lentic) fish habitat will be made by the 20 structures.
5. The use of 2,265 acres of land will be changed by the installation of the 20 structures and is tabulated as follows:

Land Use	Permanently Inundated	Intermittent Inundation	Modified by Constr.	Total
Cropland	458	511	60	1,029
Grassland	61	104	35	200
Forest Land	439	462	135	1,036
Total	958	1,077	230	2,265

Basic facilities for recreation will occupy an additional 56 acres adjacent to the two multiple-purpose structures.

Thirty-two acres of land will be cleared for a disposal area for sand removed from the Cypress Creek Channel, and 8.7 acres for the access-maintenance road.

These land use changes will cause a loss or alteration of 2,265 acres of wildlife habitat. Because of the overlap of species range, the total composite acreage for several species makes a total acreage that will be greater than the 2,265 acres. Habitat loss by species is as follows:

892 acres of deer habitat
627 acres of squirrel habitat
685 acres of rabbit habitat
685 acres of quail habitat
545 acres of dove habitat

6. One barn will be removed. Three bridges, 2,400 feet of paved road, and 4,600 feet of gravel road will need to be modified or relocated in order to install the floodwater retarding structures.

7. Flooding will be less frequent than once in three years on 75 percent of the flood plain upstream from a point 3.5 miles above the confluence with the Tuscumbia River. Damage from floodwater will be reduced by 71 percent. Suspended sediment concentration causing turbidity in Cypress Creek will be reduced by 37 percent. Stream pollution as a result of flooding of the Selmer sewage treatment plant will be eliminated. The duration and frequency of the fall and winter flooding of forest land in the downstream portion of the flood plain will be reduced, thus decreasing the attractiveness for migratory waterfowl if mitigation were not installed.
8. Easements will be obtained on about 1,000 acres of flood plain land to provide seasonal flooding with the installation of levees and water control structures. Timber, "die-offs," as a result of prolonged summer or growing season flooding, will be decreased in these areas; and attractiveness for migratory waterfowl will be maintained.
9. Five miles of stream channel will be improved for the production of fish food organisms by the removal of sand deposits. The 32-acre spoil area for the sand removal will be planted to vegetation favoring wildlife. Production of fish food organisms will be decreased by the removal of the drifts in the same stream channel segment, but the channel will have better characteristics for water flow and quality.

Hydrologic studies indicate this project will result in about a one foot reduction in stage and about a 17 percent reduction in peak discharge for the 100-year frequency storm at Valley Section #28 (see project map-Appendix E), these analysis indicate the project will have no measurable effect on stages or peak discharges of the Tuscumbia River.

At this time 39 percent of the Tuscumbia-Hatchie Basin is in planned P.L. 566 watersheds. The percent of structural control as a result of these projects is 28 percent. This level of control will not measurably reduce flooding on the main stream of the Hatchie River but will improve water quality through sediment reduction and an increase in base flow. No induced land clearing or changed land use should result from anticipated reduced flooding on the main flood plain of the Tuscumbia-Hatchie River.

Nonstructural Measures

1. The orderly transport of floodwaters of a 100-year frequency storm through the city of Selmer will not be impaired by physical restrictions in the flood plain, such as residences, businesses, or industries. Flood plain zoning will prohibit new development in areas still subject to flooding.

Economic and Social

1. The need to evacuate people and remove personal property from flood-prone areas will be eliminated.
2. Public funds formerly used for repairing flood damage to roads, bridges, and other public property can be used to meet other social needs. Private funds formerly used to repair flood damage can be shifted to the amenities of life.
3. Recreational opportunities for the people in the area will be provided by the two multiple-purpose structures. Estimated annual activity-days of use are: fishing, 6,464; boating, 2,128; picnicking, 45,000; camping, 12,000; and 14,408 for other activities such as driving and sightseeing.
4. Additional recreational opportunities will be available on 728 surface acres of water in the 18 single-purpose floodwater retarding structures if purchased by the sponsors or permission is granted by landowners.
5. An additional 300 employment opportunities will be created when the 1,214 acre-feet of industrial water supply are utilized. Four new permanent jobs associated with the recreational development will be created.

FAVORABLE ENVIRONMENTAL EFFECTS

1. Seventy-four miles of "edge" will be added in the cropland areas.
2. Eighty-four ponds will add some habitat to the pasture areas.
3. Additional tree species will be added to the 700 acres of idle land or cropland.
4. Plant communities will replace bare soil on 3,560 acres of critically eroding areas and 400 acres of roadbanks. The aesthetic appearance of these areas will be more pleasing.
5. Cypress Creek and Tuscumbia River will have less sedimentation as a result of 23,760 acres of land treatment and sediment storage in 20 structures.
6. One hundred acres of food and cover planting will be added by field border plantings.
7. Nine hundred fifty-eight surface acres of water will be added in the area.
8. Two hundred twenty-seven acres of water dedicated specifically to recreation will be added.
9. Two hundred thirty surface acres of water will be added for industrial use.
10. One thousand acres of flood plain land will provide seasonal flooding for migratory waterfowl.
11. The 958 acres of water will provide roosting and resting area for waterfowl, with 220 acres dedicated for waterfowl food production in floodwater retarding structures.
12. Seven hundred thirty-eight surface acres (958 acres winter pool) of standing water (lentic) fish habitat will be added to the area.
13. Flooding will be less frequent than once in three years on 75 percent of the flood plain upstream from a point 3.5 miles above the confluence with the Tuscumbia River.
14. Flood damages will be reduced by 59 percent.
15. Suspended sediment in Cypress Creek will be reduced by 37 percent.
16. Pollution from the Selmer sewage treatment plant as a result of flooding will be curtailed.

17. Timber "die-offs" in the flood plain will be decreased.
18. Production of fish food organisms will be improved by removal of sand from the channel.
19. Recreation opportunities in the area will be increased.



CONSERVATION MAKES GOOD OBSERVATION

ADVERSE ENVIRONMENTAL EFFECTS

1. Idle land or cropland will be replaced by pasture which decreases wildlife habitat.
2. Decreasing the plant species diversity in 700 acres of idle land or cropland, 550 acres of understocked forest land, and 500 acres for timber stand improvement will decrease the quality of wildlife habitat.
3. Two thousand two hundred sixty-five composite acres of wildlife habitat will be lost or altered.
4. One barn will be removed. Three bridges, 2,400 feet of paved road, and 4,600 feet of gravel road will be modified or relocated.
5. The attractiveness for waterfowl of some of the forest land on the downstream flood plain will be decreased.
6. Production of fish food will be decreased by removal of drifts from the stream channel.
7. Clearing along one bank of the stream and in disposal areas will reduce tree cover.

ALTERNATIVES

Alternative 1 - Acceleration of Land Treatment

Acceleration of land treatment alone would solve the critical erosion problem on the uplands and roadbanks and reduce the sediment yield at the mouth of Cypress Creek. Conservation treatment would be:

- a. Adjusting the selection of crops to those suitable to the land capability and supplementing these cropping systems with practices, such as contouring, terracing, stripcropping to hold soil losses to tolerable limits;
- b. Managing vegetation on lands used for pasture to maintain sufficient soil protection to hold soil loss to tolerable limits; and
- c. Managing forest lands by limiting grazing, controlling fire, and adopting management and harvesting practices that will maintain suitable hydrologic conditions.

Costs are estimated to be \$1,535,000. The average annual floodwater damages would be reduced about 10 percent, or \$54,100. About 958 acres would not be inundated and another 230 acres would not be disturbed by construction operations, and five miles of stream channels and banks would not be mechanically disturbed.

The streams will continue to overflow the flood plain. A 100-year frequency flood would be two feet deeper than the 1963 25-year flood of record in Selmer. Annual damages would continue to cropland, pastureland, forest land, roads, bridges, and inconvenience of disrupted mail and school bus deliveries. Opportunities for industrial expansion and development would remain limited due to lack of water supply. Recreation opportunities would not be realized. About 300 man-years of employment would not be created.

Alternative 2 - A Levee System

A system of levees extending around the residences, businesses, and industries presently located in the flood plain was studied. The levees would have been high enough to hold out the floodwaters, and pumps would have been installed behind the levees to be used for removing water from the protected area. Gates would have been needed at all road access points; i.e., highways and streets.

The protection provided by the levee system would have been only for those areas that the levees would have encompassed. There would have been no flood protection of agricultural land in the flood plain, and the floodwater damage to roads and bridges would have continued.

This system would have required 35 acres of land for the levee system and approximately 60 acres of land for borrow area to obtain material for the levees. A drainage system in the protected area to lead the water to a sump for pumping would have been required. Vector control measures would have been required in the drainage system, sump area, and borrow area to avoid developing health problems.

The levees would have been obstacles for the efficient use of the area for development and would have been an infringement on the flood plain hydraulic cross section available for flood flow. The crest of a flood flow at this point would have been higher due to constriction caused by the decrease in cross-sectional area. The total estimated cost would have been about \$2,000,000.

Alternative 3 - Floodwater Retarding Structures

The combination of land use changes, conservation treatment measures on the uplands, and only floodwater retarding structures (with multiple purpose) were studied. The stream channel disturbance, clearing for access road and disposal areas would not have occurred. Nuisance flooding, delayed crop planting, and replanting would have still plagued the farmer. Timber "die-off" and severe damage as a result of sediment and swamping would have continued on private as well as state park forest land. The cost of this alternative is estimated to be \$6,624,600.

Alternative 4 - Flood Plain Management

The combination of flood plain zoning, floodproofing, land use changes, and conservation treatment measures was considered. Floodproofing would be modifying a building so that part of the structure susceptible to flooding would withstand floodwaters with no appreciable damage. A cursory analysis was made on floodproofing the business and residential structures to withstand the eight-foot depth of flood flow. The cost would exceed \$6,000,000. Flood plain zoning would not provide protection of existing properties from flooding, but will prevent future industrial, commercial, and residential expansion in the flood plain in Selmer. Flood plain zoning will be carried out by the city of Selmer. Present damages would continue, subject to increases. Floodproofing alone without zoning or project would not have solved the threat of loss of life, interruption of business and schools, and other damages as to roads and bridges and crops. Sediment deposits in the channel would have continued as well as overbank deposition. Permanent wildlife habitat losses would not have occurred as a result of structure construction.

Another alternative would be to purchase the flood plain land and convert the land use to grassland, forest land, and parks for public use. Purchase of the flood plain land presently in urban uses would be prohibitive due to the high cost and would force families and businessmen to vacate their property, which would be detrimental to the overall

economy of the area. Existing agricultural land would continue to receive sediment and flood damage.

Alternative 5 - No Project

The net average annual monetary benefits foregone as a result of no project would be \$160,000. Leaving the watershed as it is now would result in increasing damages due to the ever-changing natural and manmade resources. Without the project, the 100-year storm would be two feet higher than the 25-year storm of record and would cause \$1.3 million damages in Selmer alone. A continued deterioration of the woodland and waterfowl habitat in the lower end of the project would be expected. Increased overbank deposition of sand and filling of the stream channel would continue. Gullies, roadbank erosion, and sheet erosion would continue to mar the landscape. If the present flood damages of \$541,100 were allowed to continue for 100 years, capitalized damages would amount to about \$25,000,000 at 5 5/8 percent interest.

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

Current land use and conservation treatment in this watershed indicates a need for concentrated efforts to plan land use conversions and treatment measures just to satisfy short-term use of the resources. The result of a successful land treatment program (62 percent adequately treated is sponsor goal) while showing immediate results in controlling sheet erosion would show slower changes in gully and roadbank erosion and yet slower changes in stream bottom sediment and overbank deposition.

The full effect of floodwater retarding structures cannot be felt until they are all installed. Once the land treatment and structures are in place, the stream will gradually rid itself of accumulated sediment deposits.

Peak flood flows will be reduced, and lower flows of longer duration will improve fish habitat.

The short-term use of the land for various agricultural purposes will be lost as a result of the installation of the project. This land loss, while having an impact on certain landowners and wildlife species, was agreeably preempted in favor of the long-term benefits of flood damage and sediment reduction.

The project appears to be compatible with projected future long-term land uses and ideas of the sponsors. While no real comprehensive planning is being done in this county, the sponsors now have a start and could continue the effort.

The total cumulative effects of this project are to reduce sediment and increase the base flow on downstream areas. Cypress Creek is a tributary of the Tuscumbia. The Tuscumbia enters the Hatchie River and finally into the Mississippi. Several PL-566 projects are either completed, being constructed, or authorized for planning that are tributaries to the Hatchie. The present condition of McNairy-Cypress Creek is a major contributing sediment source to the Tuscumbia which already has an operational watershed project. Therefore, the reduction of sediment yields at the mouth of Cypress Creek will benefit the river system. The cumulative effect of all planned watershed projects in the basin will contribute little flood reduction to the main stream of the Tuscumbia-Hatchie River.

After the 100-year design life of the structural project measures, there will still be floodwater retardation to protect the flood plain.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Installation of project structural measures will commit about 2,265 acres to the pool areas and construction areas of the dams. The lakes and sediment pools will inundate 485 acres of cropland, 61 acres of grassland, and 464 acres of forest land. About 13 miles of intermittent stream channels will be inundated.

Easements will be obtained for the installation of mitigating measures to provide controlled flooding of about 1,000 acres of flood plain land for waterfowl habitat preservation. This will require that these acres be in agricultural uses that are compatible with the flooding and resulting use by fall and winter migratory waterfowl.

Fifty-six acres of land will be committed to the development of basic recreation facilities.

The zoned portion of the flood plain not protected from the 100-year storm event by the planned project will continue to be unsuitable for intensive development, such as houses, commercial building, etc.

CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

a. General

A local referendum on November 3, 1961, authorized the formation of the McNairy-Cypress Watershed District to act as legal sponsor. McNairy County Soil Conservation District and the McNairy County Court are also co-sponsors of the proposed project.

The State Soil and Water Conservation Committee, under authority of the Governor of Tennessee, approved the sponsors' application for assistance in September 1962. The Administrator for the Soil Conservation Service authorized the beginning of planning assistance for this project on October 18, 1965. At this time, federal, state, and local agencies were notified, seeking suggestions and counsel concerning the project.

As initial field information was accomplished and sponsors' objectives were being analyzed, interested agencies and the local public were kept informed of project status. As project formulation progressed, the cities of Selmer and Ramer became sponsors of certain parts of the developing work plan. Meetings were held with all of the sponsors on a regular basis to discuss issues that continued to come up as new facts became known. These local meetings will continue even after the project is authorized for operations because of the various complex parts of this project. For example, both cities are sponsors of recreational developments. This is a new experience for them. They will be guided through installation, operations, and maintenance procedures to insure protection of their investment.

Suggestions and recommendations of cooperating and interested agencies and individuals were considered in project formulation. For example, the Biology Work Group (BWG), consisting of biologists from the U. S. Fish and Wildlife Service, the Tennessee Wildlife Resources Agency, and the U. S. Soil Conservation Service, conducted a field investigation of the project area. Their evaluation of the resources, the effects of the planned project measures on fish and wildlife habitat, and recommendations to lessen the adverse impacts are a part of the work plan.

A public informational meeting was held on April 22, 1971, at Selmer to fully explain the proposed project. An informal field review was held in November 1973. This allowed interested individuals, groups, and agencies to present comments on the plan and the preliminary draft environmental impact statement. These recommendations have been considered in the plan and draft environmental impact statement. Prior to interagency review, a second public meeting was held. Additional comments and recommendations will be considered in preparation of the final plan and environmental impact statement.

As shown in Appendix B the plan has been coordinated with the Tennessee Historical Commission and the Tennessee Department of Conservation, Division of Archaeology; and installation of the structural measures will not conflict with any planning for preservation of historic sites or structures in the watershed.

Coordination with the Tennessee Division of Archeology is being maintained. Contracts for archeological investigations are underway by a professional archeologist.

On July 2, 1975 representatives of Tennessee Wildlife Resources Agency and Soil Conservation Service met to clarify questions and comments concerning the plan and environmental statement. Comments of this agency were resolved at this meeting as indicated by Mr. Hatcher's letter of July 8, 1975.

On August 13, 1975 the sponsors held a meeting which was attended by Mr. Campbell of the Tennessee Conservation League, representatives of the Soil Conservation Service and other interested individuals. Comments and questions raised by the Tennessee Conservation League were resolved at this meeting.

Discussions and deposition of each problem, objection, or issue raised on the draft environmental statement by federal, state and local agencies, private organizations and individuals.

Environmental Protection Agency

1. Comment: We have reviewed the Draft Environmental Impact Statement for the McNairy-Cypress Creek Watershed in Tennessee and find that it has adequately outlined the precautions to be used to control erosion, sediment, and water pollution. Precautions identified to control these deficiencies should be implemented throughout the life of the project. It is recommended that continuous monitoring be conducted of all sediment traps in order to detect and correct conditions that could reintroduce sediment into the stream.

Response: Monitoring of watershed conditions will be carried out by SCS personnel at the county, area and state level.

2. Comment: We suggest, however, that the final statement update the status of the Selmer STP with any plan for secondary treatment. The anticipated reduction of sediment in Cypress Creek below Selmer could make the effects of the Selmer STP primary treatment discharge more pronounced, since the sediment particles do bind up contaminants, and water problems could occur without the masking effects of high sediment.

Response: The following statement was added to page 16 of the final EIS:

"Selmer has now installed secondary treatment facilities. Additional treatment capacity is also planned."

Page 20 of the final plan has also been corrected.

3. Comment: Estimates of sedimentation (Method on Page 108 work plan) were based on the Musgrave Soil Loss Predicting Equation since the Universal Soil Loss Equation had not been adopted at this time. The USLE accounts for total rainfall energy for a specific area rather than the rainfall amount; therefore, some checking calculations using some of the USLE should be made to insure the sedimentation data is reasonable and that the Musgrave equation was adequate for this area.

Response: Since 1965 the SCS has used Iso-Erodent index data with the Musgrave soil loss equation. This data was presented in Agri. Handbook No. 282 USDA-ARS, May 1965. This data is the same as that used in Bulletin 418, April 1967. Bulletin 418 published by the University of Tennessee - Agricultural Experiment Station and the SCS is the basis for estimating soil loss with the universal soil loss equation. The rainfall factor does not cause any difference in erosion computations for this plan as the same Iso-Erodent is used in each formula.

4. Comment: Although the Draft Statement mentions that no facts are known about the insecticide residues in this stream (Page 24), there may be some soil data from surrounding farmland available from USDA. This data could be used to estimate residues in stream bottoms and banks to approximate residues released during disruption of sediments. Since this area is heavily agricultural, pesticide residues should be an important consideration.

Response: McNairy-Cypress Creek Watershed is typical of watersheds in the coastal plain of West Tennessee. The conditions of geologic parent material, soils, topography, farming practices, techniques, crops, land use and problems are typical of watersheds in the Hatchie and Obion Basins. Recent sampling and testing in the Obion Basin should be closely related and indicative of those in Cypress Creek as far as agricultural problems are concerned. (Data on file). Testing throughout the Obion Basin shows no serious pesticide problems.

5. Comment: Finally, the Statement does not state that there are possible implications pursuant to Section 404 of Public Law 92-500. We would like to point out that if the project is to proceed, appropriate Federal permits may be needed pursuant to the Federal Water Pollution Control Act Amendments of 1972 (FWPCA). Cypress Creek contains "waters of the United States into which the discharge of any pollutant by any person shall be unlawful" under Section 301 (a) FWPCA. The violation of 301 (a) of the FWPCA will occur unless a Federal permit is obtained for the discharge of the pollutant into the main stream. Any discharge of dredged material or of fill material into the wetlands that fills or blocks bypassed portions of the river's natural channels may require a Section 404 permit from the U. S. Army Corps of Engineers. Discharge of pollutants other than dredge material into Cypress Creek may require Section 402 (NPDES) permits from EPA.

Response: P. L. 566 requires the SCS and Sponsors to comply with all existing or enacted state or federal laws. The requirements of P. L. 92-500 will be met as applicable at that time.

6. Comment: Utmost care should be taken to prevent spoil etc. deposited on stream banks from washing or falling back into the stream bank since it may result in the violation of Federal laws.

Response: Planned spoil areas are removed from the channel by several hundred feet and will be vegetated as shown on page 54 of the plan.

Comment: In light of our review, we have assigned a rating of LO - (lack of objection) to the project and 2 (insufficient information) to the impact statement.

Response: Noted.

Tennessee Department of Transportation

Comment: This plan has no conflict with DOT plans.

Response: Noted.

Tennessee Historical Commission

Comment: This plan has no conflict with Historical Commission priorities.

Response: Noted.

Tennessee Bureau of Environmental Health Services

Division of Water Quality Control

- a. Comment: Personnel of the Jackson office of the Division of Water Quality Control have reviewed the material concerning the above referenced project. We find that we have no major objections, from a water quality standpoint, to the project as presented in the submitted material.

Response: Noted.

- b. Comment: The McNairy-Cypress Creek watershed project does provide for considerable recreational type development which will enhance recreational opportunities for the 10,000 people living in the watershed area as well as people living in the region. Negative environmental impact created by recreational development in the project area would appear to be minimal. Presently there is considerable erosion and flooding in the proposed area. Camp sites and sanitary facilities to serve the recreational areas outlined in the project plan should be approved by the local health department environmental health staff prior to beginning construction of the project. The sponsoring agencies of the McNairy-Cypress Creek Watershed have prepared a good project plan for review.

Response: P. L. 566 requires appropriate city, county and/or state health regulations and permits be secured prior to construction.

c.

Vector Control Section

Comment: In reference to the statements in the McNairy-Cypress Creek Watershed environmental impact statement regarding vector control requirements in the construction and maintenance of impoundments, all ponds or lakes greater than one acre in size must be permitted with a construction permit and an impoundage and maintenance permit from the Division of Sanitation and Solid Waste Management in the Tennessee Department of Public Health. In order for the proposed impoundments to be permitted, they must meet the structural specifications set forth in the Tennessee Impounded Water Act, Tennessee Code Annotated Sections 53-801 - 53-809.

Response: SCS standard construction specifications in Tennessee are in accordance with the Tennessee Impounded Water Act. The sponsors will secure permits as required.

Southwest Tennessee Development District

Comment: At present, we have no comments concerning the Environmental Impact Statement or the Work Plan other than to state that the District supports the Watershed Program and find no conflicts with any existing or proposed regional plans.

Response: No response necessary.

Coast Guard

Comment: The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to this project.

Response: No response necessary.

Wildlife Management Institute

The Wildlife Management Institute letter of comment is Number XI in Appendix B. The single comment expressed concern regarding the cumulative effect of P.L. 566 watershed on the entire Hatchie Basin.

Response: The Soil Conservation Service in Tennessee will follow all guidelines as set forth for projects in which the Service participates. These guidelines require an evaluation of downstream effects of watershed projects.

The planning of a watershed project and evaluation project and evaluating environmental effects requires several years of study and preparation. During this time we assemble great amounts of detailed data and inputs from all available sources which would be too voluminous to include in the Environmental Impact Statement. We have evaluated the single project effect and the cumulative effect of watersheds now planned in the Basin. We feel an analysis of the projects planned would be a more realistic approach rather than projecting multiple combinations of projects which may never become a reality.

We have assumed your comment refers to possible flood reductions on the Hatchie River flood plain, induced land clearing, and changes in stream flow.

In view of these assumptions, the following data is assembled from watershed plans. These projects represent 1,026 square miles or 39 percent of the 2,601 square miles in the Hatchie Basin. This analysis is based on projects as planned.

<u>Watershed</u>	<u>Drainage Area</u>	<u>Controlled Area</u>	<u>Percent Control</u>
Tuscumbia River (Miss.)	384.70	98.41	28
West Hatchie (Miss.)	74.65	36.56	49
Cub Creek	16.80	7.45	44
Cane Creek	89.10	28.84	32
Muddy Creek	126.20	49.11	39
Bear Creek	49.20	2.19	5
Porters	69.69	25.90	37
Clover*	80.80	---	-
Cypress Creek	171.25	41.33	24
Total	1026.00	289.8	28 Average

*In the planning process.

This analysis does not include all possible projects in the basin but does show the level of control generally achieved by such projects. With a total of 28 percent control in planned projects with only 39 percent of the basin planned, little change is expected in flood patterns on the main river flood plain. The primary effects on the river will be an improvement in water quality through sediment reduction and an increase in base flow.

As shown in the EIS on pages 28 No. 8, 28 No. 1 and 30 No. 7, the primary downstream effect will be sediment reduction. Page 30 also shows that flooding will continue in the lower end of Cypress Creek and in Tuscumbia River. This is to be

expected as most watersheds planned for agricultural areas do not achieve a level of control sufficient for the project to be effective outside of the project boundary. These effects from the Cypress Creek project could be multiplied many times to reflect the cumulative impact of all watershed projects in the basin. These effects would be a reduction of erosion, sedimentation and flooding on the tributary and a reduction of sediment deposits on the main flood plain.

Our studies indicate that project will result in about a one foot reduction in stage and about a 17 percent reduction in peak discharge for the 100-year frequency storm at Valley Section # 28 (see project map). Also, studies indicate that the project will have no measurable effect on stages or peak discharges of the Tuscumbia River.

We would like to point out that Clover Creek Watershed in the table is now in advanced planning status. This plan as now being formulated includes a massive land-critical area treatment program. Presently, no structural measures are included.

While the foregoing data is briefly presented, we believe this analysis, along with data in the plan and EIS, properly assess the downstream effect of this project alone and in conjunction with the other plans on the receiving waters.

Based on this data no induced land clearing or changed land use should result from anticipated reduced flooding on the main flood plain of the Tuscumbia-Hatchie River.

A very detailed, exhaustive hydrologic analysis of all possible combinations of watershed projects would be based on assumptions which may or may not prove to be correct. Such an analysis would not be as valid as the one briefly presented which is based on planned projects.

We feel the foregoing analysis along with other data in the plan and EIS properly assess the downstream effects of the Cypress Creek Project alone and in conjunction with other projects on receiving waters as required by the guidelines.

The review of data collected through the years of planning on this project revealed that one of the early requests for project action in this watershed was from wildlife interests. Mr. Travis McNatt, former Tennessee Game and Fish Commissioner and past President of the Tennessee Conservation League, initiated this request in 1968 (Appendix B). One of the primary purposes of this plan is to alleviate these damages due to erosion and sediment deposition and resulting timber kill.

As illustrated by several recent meetings in West Tennessee, we believe the primary problem is erosion and sediment deposition. Damages to wildlife, forest and agriculture will continue unless appropriate measures are taken. Projects are being planned with all of these interests considered.

In relation to your request to re-open the Hatchie River Basin Study, we have reviewed our present situation. The implementation of the Water Resources Council "Principles and Standards" and requests from State and local units of government on the Obion Forked Deer River Basin have required us to extend the completion date of this study until 1978. It has also delayed our schedule for completion of the Chickasaw River Basin Study. As a result of the Water Resources Development Act of 1974, we are involved in cooperation with the Corps of Engineers and the State of Tennessee in developing a comprehensive plan for the New River Basin. These commitments together with the personnel ceiling under which we are operating would not allow us to re-open the Hatchie River Basin Study at the present time. Also, in order for the Soil Conservation Service to participate in a river basin study of this type, we would need an official request from one or more State or local units of government. To date, we have not received such a request to re-open the study.

If you have some additional questions as a result of the data presented here, we will be happy to meet with you at any time.

Department of the Army

1. Watershed Work Plan

Comment: The channel is to be excavated as much as 10 feet. The general area is susceptible to erosion and gullyng is mentioned. However, there is no indication of any attempt to prevent tributary erosion due to the entrenched creek.

Response: There is no channel excavation planned for this project. The method of channel clean out (sand pumping) was selected to avoid damages as indicated in the comment. The sand removal will be very gradual over a period of 4-5 years. It is expected this slow process will allow channel banks to remain stable. Tributary channels are expected (and it is desirable) to degrade slowly with the main channels. Upon completion all tributaries in the clean out reach will then enter through control structures in the waterfowl mitigation areas. Other tributaries will be controlled as shown in paragraph 2 on page 55 of the plan.

2. Comment: Page 4. The sketch that is supposed to be at the top of the page was omitted.

Response: The sketch was added. (See page 2 of the EIS.)

3. Comment: Page 11. The sketch of the section through the structure indicates the outlet pipe will be near the top of the channel bank and set back from the side slope. Experience of past performance of this type installation dictates some form of bank protection such as paved ditches or riprap slope protection. This should be clarified. As shown, the slope will continue to erode and endanger the levee.

Response: The sketch is for illustrative purposes only. Actual design will be to prevent bank erosion. Note: These "levees" will be from 2 ft. to 4 ft. high.

4. Comment: Page 12, 2nd para. This paragraph states that the user is responsible for the water quality standards which would be the entire pool of the impoundment. Actually, the user is only responsible for maintaining standards on his withdrawal. This should be clarified.

Response: This has been clarified as follows:

"Water quality standards prescribed by the Tennessee Department of Public Health will be met and maintained by the industrial users of the water withdrawn from the impoundment." (See page 6 of the EIS.)

5. General

Comment: Water quality of the streams should be discussed, especially the two multi-purpose impoundments that are being designated for recreational use. In rural areas, the main water quality parameters that affect recreational use are the total and fecal coliform bacteria counts. This is generally the result of septic tanks and stock pens and limits the water use to secondary water contact, such as fishing and boating. Primary body contact sports will be prohibited. Also, the water quality is of prime interest to industrial users, in particular an industry that would use these waters for cooling or steam generation.

Response: All streams within the watershed are intermittent except the lower eight miles of Cypress Creek which has perennial flow (p. 11 of plan). This perennial flow is effluent from the town of Selmer, particularly the sewage treatment plant which has primary and secondary treatment (p. 16 of EIS). Neither multi-purpose impoundment is affected by this effluent of Selmer.

The primary problem of water quality is the sediment load. There are no known point sources of pollution upstream from these structures. Water quality and quantity as related to industrial users was investigated by the Service and consultant engineers representing Selmer and found to be satisfactory as shown on page 46 of the plan and page 23 of the EIS. The Tennessee Division of Water Quality Control (Appendix B) found the water quality to be acceptable.

6. Comment: A discussion of the ground water quality and availability should be included. The use of ground water obtained from deep wells could be an alternative for industrial use rather than reservoir impoundment.

Response: Page 11 of the plan and page 15 of the EIS covers availability and quality of ground water.

Page 38 of the plan discuss present and future water quality needs for Selmer. The decision to include industrial water supply was made by Selmer in conjunction with consultant engineers representing the town.

7. Comment: The EIS does not quantify the wildlife resources of the area to be disturbed and upon which the mitigation plan was derived. The effect of the project on the wood duck and bald eagle, for example, is not addressed.

Response: The effect of the plan on wildlife of the area are described on page 34 of the EIS. The wildlife investigations were carried out by the biology work group (page 40 of EIS). The mitigation measures were planned in accordance with their recommendations. These plans were reviewed and concurred in by Tennessee Wildlife Resources Agency and U. S. Fish and Wildlife Service. Present wood duck brood habitat is in old oxbows, channel runs and beaver swamps. These areas will be maintained in their present condition as stated on pages 9 and 17 of the EIS. Contacts with all of the agencies and organizations as shown on page 63 of the EIS have not reported the bald eagle as endemic to the project area though migrating birds may pass through or briefly use the area. Where an item is not addressed no effect is anticipated.

8. Comment: There are no figures on induced land clearing resulting from the project presented in the statement and no indication whether this was considered in the mitigation plan.

Response: Environmental Impacts from page 27 to 30 show the amount of clearing expected as a result of the plan. Present forest land acres (1465) as shown on p. 25 of the plan and future acres (1377) on page 68 are the result of clearing for structure installation. No induced land clearing is expected as is shown on page 9 of the EIS because of the following:

1. Almost all forest land is in the lower end of the watershed.
2. Little flood reduction and no benefits were claimed in this area.
3. A large part of the forest is in Big Hill Pond State Park and large lumber company holdings.
4. Other forest owners have indicated their areas will remain in forest.

Department of Interior

- a. Comment: It is suggested that cultural resources be discussed as a component of the Environmental Quality (EQ) account. The sections on "Measures of Effects" and "Irreversible and Irretrievable Commitments of Resources" should also discuss cultural resources.

The EQ plan should be expanded to include considerations given in compliance with preservation procedures for cultural resources as described in your watershed planning document, "Preparation of Environmental Impact Statement Guidelines" (7 CFR, Part 650).

Response: The comment has been noted but no change was made. Contact with Tennessee state agencies having responsibility in this area, indicates no known sites to be affected by the project. Inclusion of a cultural resource component in the EQ plan or in the EQ account for the selected plan would therefore be presumptive.

The intent of preparing an EQ plan for projects being processed during the phase in period of the Principles and Standards is to demonstrate an alternative approach to plan formulation which emphasizes contributions to the EQ objective. The EQ plan for the McNairy Cypress Creek Watershed is such a plan and is abridged in detail. The plan is real in the sense that it could be implemented but would first require local acceptance. Significant local funding would be required to implement the plan. In view of these major road blocks, discussion of preservation procedures for cultural resources which would be followed in implementing the plan is highly problematical.

- b. Comment: Work plan provisions are the same as proposals upon which our previous fish and wildlife reconnaissance report was based, except for stream channel works. The original proposal of 24.6 miles of channel excavation and 6.6 miles of channel clearing and snagging has been reduced to a sand-pumping operation on the lower 4.78 miles of the main stem. The Department endorses this approach.

Response: No response necessary.

- c. Comment: On pages 106 and 117, it is indicated that the average annual use of multiple-purpose structures 4 and 13 would be 80,000 "visitor-days." It would be appropriate to indicate an estimate of the nondiverted, or "new," recreation use that would be generated by the project if, indeed, the total use estimate is made up of both "new" use and use that would be diverted away from existing resources. The recreation benefit evaluation should reflect this recreation use calculation.

Response: Tennessee SCORP shows that this region is short more than 1 million activity occasions each in fishing, boating, picnicking, hunting, swimming and playing outdoor games. Our planning concept is that this project use estimate is for "new" use and will not divert recreationists away from existing resources. Existing facilities do not meet the current or projected demand.

- d. Coment: Pages 106, 117, and 170 indicate that \$1.50 was assigned to each of the 80,000 "visitor-days" to result in \$120,000 average annual benefits. The 80,000 "visitor-days" figure was derived by summing what has been termed "activity days" (or, "activity occasions"); i.e., fishing, 20,000; boating, 8,000; picnicking, 20,000; camping, 8,800; hiking 8,800; hunting, 4,800; and 9,600 other. Where at least some variety of recreational opportunity is offered at water resource development projects, it is commonly assumed that a "recreation day" is constituted by more than one "activity day," usually in the range of from two to three. Pursuant to "Principles and Standards for Planning Water and Related Land Resources" (page 52) it is the number of "recreation days" to which is assigned a unit dollar value. Using this approach, the "recreation day" estimate would be less than the 80,000 figure and the corresponding benefits would be reduced as well. The work plan and page 48 of the draft statement should be changed to reflect the correct computation of recreation days and corresponding benefits.

Response: The comment is correct in pointing out our misuse of the terms "visitor day" and "activity occasions." The use of the 80,000 visitor day has been corrected to 60,000 visitor days. In view of the nature of development planned and in updating other data in the plan we are changing the \$1.50 to \$2.00 for each activity occasions. In consultation with the Tennessee Wildlife Resources Agency and Department of Conservation we have also adjusted the estimated annual activity-days as follows: 6,464 fishing, 2,128 boating, 12,000 camping, 45,000 picnicking, and 14,408 miscellaneous activities such as sightseeing, walking, bird watching, etc. The peak use will occur during the summer months within a 150-day period. Use will be made throughout the entire year. Design capacity is estimated to be about 1,200 with an average annual use of about 60,000 visitor days.

- e. Comment: The work plan has not adequately considered cultural resources. Data should be presented documenting the presence or absence of cultural resources. All areas where land disturbances may occur from implementation of the proposed impoundments should be surveyed by a competent, professional archeologist. Any archeological resources should be described and evaluated for their National Register potential. If they meet the criteria outlined in Title 36 CFR 800.10, they should be nominated to the National Register of Historic Places and compliance with Title 36 CFR 800.4 should be documented.

Certain sections should be expanded to document cultural resource considerations recognized by the agency in the planning process. Cultural resources, as vital aspects of the human environment should be addressed under "Environmental Considerations." In the section entitled "Alternative Selection" it is stated that project plans were formulated in 1970-71. It is suggested that implementation of these plans without adequate evaluation of watershed resources could result in the inadvertent destruction of non-renewable elements of the human environment. This section should be expanded to show that required considerations, as described above, have been met.

The section on "Land Treatment Measures" (page 77) should acknowledge that technical assistance may also have to be furnished to landowners for preservation or use of cultural resources which may be recognized by professional surveys and evaluations.

Response: Archeological investigations are currently under contract with a professional archeologist.

Discussions of plan alternates were initiated in 1971. Selection of the proposed plan was made in 1972 as shown on page 47 of the plan. SCS guidelines "Preparation of Environmental Impact Statement Guidelines" (7 CFR, part 650) were published for comment on November 19, 1973. Final guidelines were published on June 3, 1974. In November 1973 the SCS in Tennessee began implementation of archeological portions (and others) of these guidelines with contacts with the State Division of Archeology and archeologists at other locations. In January 1974 the SCS in Tennessee began contracting for archeological investigations on water resource projects. Due to the priority of older projects already under construction and others in advanced planning stages and a shortage of consultant archeologists to contract for this work, investigations on the McNairy-Cypress Creek project were delayed.

Since January 1974, the SCS in Tennessee has contracted for archeology investigations on 17 water resource projects covering approximately 4,000,000 acres.

On June 26, 1975 a contract was awarded to Dr. Drexel Peterson of Memphis State University for investigation of 4 watershed structure sites in the McNairy Cypress Creek project as well as a general reconnaissance of the entire watershed. Detailed investigations will be contracted in 1975 and 1976 on the remaining 16 sites. This will be prior to implementation of the plan as stated on page 21 of the plan and page 20 of the EIS.

The following statement has been added to page 51 of the final plan.

"Technical assistance will be available to landowners from the Tennessee Department of Conservation, Division of Archeology, to evaluate any artifacts discovered during land treatment installation."

- f. Comment: It is recommended that a Table of Contents be included in the final environmental statement, in order to facilitate the review process.

Response: A table of contents has been included in the final EIS.

- g. Comment: It is suggested that the proposed construction of 18 water impounding structures be mentioned in the Description of Project Purpose and Action (Summary Sheet, paragraph IV), as two multiple-purpose structures have been mentioned, but the other 18 structures have not.

Response: The reference to the two multi-purpose structures has been deleted.

- h. Comment: Planned land-treatment measures are first enumerated in detail on pages 2-3 of the draft environmental statement. It would be advisable to specify whether such structural measures as 40,000 feet of ditches and 115,000 feet of diversions are proposed as Government actions or are proposed for installation by local owners and operators with technical assistance or other encouragement from the sponsoring organizations.

Response: The cost sharing and method of installation for land treatment measures are shown on pages 48-51 and 59-60 of the plan.

- i. Comment: The impacts of the proposed project on ground water resources have not been adequately evaluated. The 20 proposed project impoundments will be located in a very significant recharge area, almost directly upon exposures of the most permeable portions

of the important Cretaceous aquifers. Thus, it is necessary to discuss the effects on water levels and artesian pressures in the project vicinity due to the impoundments and flood retardation measures. Any significant changes anticipated in recharge patterns or in the quality of water should be discussed.

Response: Past experience of floodwater retarding dams in West Tennessee indicates that ground water recharge is very short lived due to the sealing effect of sediment deposits. Cooperative studies carried out by the Nashville office of U.S. Geological Survey with the SCS bear out this observation.

In bank storage around the permanent water impounded should increase but no changes in water quality or recharge patterns are anticipated. Contact with the Nashville and Memphis offices of the U. S. Geological Survey continue to support this conclusion that little if any change in ground water recharge or quality will occur as a result of this plan.

- j. Comment: Current mineral production in McNairy County consists only of sand and gravel. The proposed action will largely preempt future extraction of such surficial deposits in the project area. The statement should acknowledge that indepth mineral potential is not known and the benefit-cost comparison in the work plan should account for the known mineral losses and recognize potential unknown losses.

Although implementation of the plan should have no significant impact on the supply of minerals in the project area, an evaluation of effects of mineral preemption should be included in the system of accounts required by the Water Resources Council "Principles and Standards" (work plan addendum, January 1975).

Response: During the planning process all dam sites were plotted on state mineral resource quadrangle maps. (Masseyville, Mt. Peter, Rose Creek, Purdy, Chewalla) No present or projected mining operations are located within these sites.

These mineral resource reports indicate that heavy mineral extraction from the McNairy sand may prove valuable in the future. However the reports further indicate these resources to be located a number of miles north of the watershed project. In any event the pools of all sites (except Nos. 4 & 13) can be drained without infringing upon the flood control aspect of a particular site. No mineral resources should be lost as a result of this plan.

- k. Comment: The first paragraph of this section is erroneous with reference to a 1963 fishery survey in Cypress Creek. The Biology Work Group's investigation of the watershed in 1965 resulted in a preliminary report by that group which stated that Cypress Creek has a fishery comparable to the Tuscumbia River into which Cypress Creek flows. A fish population study of the Tuscumbia River in 1963 by the Mississippi Game and Fish Commission, et al., was cited which showed 169 pounds per acre. The paragraph should be rewritten to reflect the above.

Response: The paragraph has been rewritten as follows:

The stream fishery resources are low to negligible and are confined to the downstream half of the main stem of Cypress Creek (USDA et al. 1968). A 1963 study on Tuscumbia River found 284 pounds of fish per acre (Appendix B, Biology work group report). A study (Tennessee Wildlife Resources Agency and Mississippi Game and Fish Commission) in Muddy Creek (Hardeman County, Tennessee) showed 45 pounds of fish per acre. Cypress Creek fishery resources are comparable to these populations.

- l. Comment: Also, the Fish and Wildlife Service report is referenced as Appendix D. This should be corrected to read Appendix C.

Response: This reference is now Appendix B in the final plan.

- m. Comment: We believe the draft environmental statement adequately recognizes damages to fish and wildlife habitat and presents beneficial effects in an acceptable manner.

Response: No response necessary.

- n. Comment: The statement does not adequately identify cultural resources nor does it adequately assess the projects' potential environmental impacts on these resources. We believe that compliance with the Soil Conservation Service's "Preparation of Environmental Impact Statement Guidelines" (7 CFR, Part 650) will result in an adequate evaluation of potential impacts upon cultural resources.

The final statement should address the following specific suggestions for adequate consideration of cultural resources.

a. All necessary surveys should be undertaken to determine the presence or absence of cultural resources.

b. Surveys should be conducted in areas of primary impact such as proposed channelization, diking, control structures, land clearing, road construction, etc., and in areas of secondary impact where any action by Federal agencies will affect land surfaces, or actions by private individuals sponsored or assisted by Federal agencies will affect land surface, such as additional clearing of agricultural land as a result of a Federally sponsored channelization project.

c. In coordination with the State Historic Preservation Officer, any resource found in the watershed that is eligible for the National Register of Historic Places should be nominated. Section 106 of the Historic Preservation Act of 1966 then applies.

d. As a result of the completed surveys, adequate data should be prepared and discussed in the statement pertaining to those resources not requiring further professional work, those resources requiring additional work, and steps taken to expedite required preservation activities, in accordance with 36 CFR, Part 800.

The final statement should also discuss the possibility of salvage should cultural resources be discovered during construction. Financing and preparations for salvage are to be worked out in accordance with P.L. 93-291 (Reservoir Salvage Act Amendments).

Response: As pointed out in response to Comment e. above these investigations are underway by a professional archeologist. They will not be completed prior to preparation of the final EIS. Proper procedures as found in Section 106 of the Historic Preservation Act, 36 CFR Part 800 and P.L. 93-291 will be carried out.

- o. Comment: The following comments refer to recreation and are presented according to the format of the statement.

Included in this section should be a discussion of shoreline access control measures at Structures 4 and 13 in order that the recreational resources are protected from incompatible development, thereby ensuring maximum public opportunity and enjoyment for the public investment involved. This is critical relative to the small size of the impoundments and the recreational use projected for them. We suggest that these two structures have shoreline controls adopted for them so that public access to the recreational features will be available.

Response: As stated on page 52 and 53 of the plan and page 3, 9 and 11 of the EIS public access will be controlled to insure water quality and public opportunity. Land acquisition will be in fee simple in order to have shoreline control.

- p. Comment: The final environmental statement should include a discussion of the characteristics of Big Hill Pond State Park which lies at the extreme southwestern end of the watershed. Land for this State Park was acquired through financial assistance from the Land and Water Conservation Fund administered by the Bureau of Outdoor Recreation (Project No. 47-00007). Any anticipated impacts on this park should receive detailed discussion in the section on environmental impact. Full coordination with the administering agency regarding impact identification, mitigation measures, and possible alternative treatments should be evidenced.

Response: A lengthy discussion of Big Hill Pond State Park is not appropriate for this plan. The planning of the park is indicated on page 21 of the plan. As stated on page 56 of the plan the park will be unaffected by the project except for a reduction of timber kill by sediment deposition.

On April 27, 1973, representatives of the Tennessee Department of Conservation and Soil Conservation Service met to discuss the watershed plan and its relationship to the proposed park. The Department of Conservation found no conflict with the watershed plan and plans for development of the park. The SCS has furnished technical assistance in the planning of the park since its inception. (Data on file.)

- q. Comment: A 1972 update of the Tennessee Statewide Comprehensive Outdoor Recreation Plan has been compiled by the State and should be referenced in addition to the 1969 Plan. It would be appropriate to consult with State recreation planners to assure correct interpretation of the plan.

Response: The reference has been changed to 1972. As shown in Appendix C, No. 8, the SCS was a principal agency in "Appraisal of Potentials for Outdoor Recreational Development," McNairy County, Tennessee. The SCS also participated in all other county appraisals and in the updating of this data. Constant liaison is maintained with the Department of Conservation concerning the state plan.

- r. Comment: We are very concerned over the effects the industrial water draw-down will have on the recreational opportunity afforded by Structure 13. The draft statement does not discuss this issue. It appears likely that the drawdown and resulting mudflats will significantly affect the quantity and quality of the recreation experience. The final statement should fully disclose all anticipated effects of this operational feature of Structure 13 on public recreation.

Response: The operation and drawdown of the industrial water supply is shown on page 85 and 86 of the plan and page 3 of the EIS. The data on page 85 and 86 shows a maximum draw down of 5.9 feet. The plan states there will be fluctuation (operated) between Elev. 487.8 and 481.9.

The vector control regulations referred to on page 72 of the Plan and page 6 and 11 of the EIS will require deepening of the shoreline (summer) of all reservoirs. For site 13 this deepening will be from 487.8 to 484.8 M.S.L. Therefore fluctuation of the industrial pool by this 3 feet will not expose any mudflats. Further draw down may or may not be

detrimental, depending on the rainfall and draw down requirements. The following table indicates average monthly rainfall would be ample to sustain high pool elevations except during the months of August, September, and October:

Average Monthly Rainfall Data

January	5.33	April	4.59	July	3.88	October	2.98
February	5.42	May	3.84	August	1.84	November	4.48
March	5.34	June	4.35	September	3.37	December	5.08

Drawdown during this period is beneficial and recommended for fish management purposes. Recreational use should not be affected by the drawdown feature. Recreational use on the numerous flood control reservoirs in Tennessee are well documented and exceeds by several times the estimated user days. All of these reservoirs have wide variations in pool elevations and mandatory drawdown in late summer and fall. While this may not be the most desirable condition, it appears to be well accepted by the public. The following will be added to the first paragraph on page 3 of the EIS exclusive of rainfall data.

"The industrial water supply will be operated between Elev. 487.8 and 481.9 feet MSL. The shoreline deepening from 487.8 to 484.8 will prevent exposure of mudflats during this increment of drawdown. Further drawdown below 484.8 will expose some mudflats. The area and extent of exposure will depend upon the rate of drawdown and rainfall during this period."

- s. Comment: No specific provision for outdoor recreation opportunity has been indicated for the 18 single-purpose structures. The final statement should indicate the nature and extent of the opportunity to be available and under what conditions. For instance, if the opportunity to be available would be only incidental fishing contingent on landowner permission, then that should be so stated.

Response: Page 72 of the plan and pages 28, 29 and 32 of the EIS list the various benefits and favorable effects of the project. No recreational benefits are claimed for the 18 floodwater retarding structures.

The following sentence has been added to page 53, paragraph 1 of the final plan.

"the sites will not have public access unless sites are purchased by the sponsors or the landowner grants permission."

and page 31, No. 4 of the EIS.

"structures if purchased by the sponsors or permission is granted by landowners."

Tennessee Conservation League

Comment: The Tennessee Conservation League's letter of comment is Number XI in Appendix B. Their single comment expressed concern regarding the cumulative effect of P.L. 566 watersheds on the entire Hatchie Basin.

Response: This comment is the same as that submitted by the Wildlife Management Institute. The response to that comment is on page 44 and should be consulted.

In addition it should be noted that this comment refers to Cypress Creek as a tributary to the Hatchie River and the effect on the Hatchie as a scenic river. This is not entirely correct. Cypress Creek is a tributary to Tuscumbia River as shown in the stream classification system on page 16 of the EIS. The Tuscumbia River is not a part of the scenic river system and flows for a distance of approximately 6.4 miles from its confluence with Cypress Creek to its junction with the Hatchie River. In any event the evaluations would be the same.

Tennessee Office of Urban and Federal Affairs

Tennessee Wildlife Resources Agency

Comment: The Tennessee Wildlife Resources Agency raised several questions and comments on the draft plan and EIS. Their letter in Appendix B itemizes these questions and comments.

Response: As suggested in the letter from Tennessee Office of Urban and Federal Affairs, representatives of the SCS and TWRA met on July 2, 1975 to discuss these comments. As illustrated by Mr. Hatcher's letter of July 8, 1975, these questions and comments have been resolved.

The following federal, state and private groups were requested to officially review and comment on the final work plan and the draft environmental impact statement:

Governor of Tennessee	Tennessee Conservation League*
Department of the Army*	Wildlife Society
Department of the Interior*	Tennessee Environmental Council
Department of Health, Education and Welfare	Wildlife Management Institute*
Department of Commerce	Office of Equal Opportunity
Environmental Protection Agency*	Advisory Council on Historic Preservation
Federal Power Commission	Natural Resources Defense Council
Department of Transportation*	Friends of the Earth
Tennessee Office of Urban and Federal Affairs (State Clearinghouse)*	Environmental Defense Fund
National Audubon Society	Environmental Impact Assessment Project
National Wildlife Federation	Southwest Tennessee Development District*

*Comments were received from these agencies.

LIST OF APPENDIXES

- Appendix A - Comparison of Benefits and Costs for Structural Measures
- Appendix B - Letters of comment received on the Draft Environmental Statement and Letters of Coordination
- Appendix C - References
- Appendix D - Illustrations of Typical Sections of Channel Work and Mitigation Areas
- Appendix E - Project Map

APPROVED BY _____ DATE _____
(State Conservationist)

September 1975

COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES
McNairy-Cypress Creek Watershed, Tennessee
(Dollars)

Evaluation Unit	Damage Reduction 2/	Average Annual Benefits 1/				Total	Average Annual Cost	Benefit-Cost Ratio
		Local Secondary	Industrial Water Supply	Recreation	Redevelopment			
Floodwater retarding structures, multiple-purpose structures, basic recreation facilities, & stream channel work	294,600	51,600	30,800	75,600	120,000	572,600	374,800	1.5:1.0
Project Administration	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	37,800	xxxx
GRAND TOTAL	294,600	51,600	30,800	75,600	120,000	572,600	412,600	1.4:1.0

1/ Price base - Adjusted Normalized.

2/ In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of \$25,000 annually.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

1421 PEACHTREE ST., N. E.
ATLANTA, GEORGIA 30309

June 16, 1975

Mr. Donald C. Bivins
State Conservationist
U. S. Department of Agriculture
Soil Conservation Service
561 U. S. Customhouse
Nashville, Tennessee 37203

Dear Mr. Bivins:

We have reviewed the Draft Environmental Impact Statement for the McNairy-Cypress Creek Watershed in Tennessee and find that it has adequately outlined the precautions to be used to control erosion, sediment, and water pollution. Precautions identified to control these deficiencies should be implemented throughout the life of the project. It is recommended that continuous monitoring be conducted of all sediment traps in order to detect and correct conditions that could reintroduce sediment into the stream.

We suggest, however, that the final statement update the status of the Delmer STP with any plan for secondary treatment. The anticipated reduction of sediment in Cypress Creek below Selmer could make the effects of the Selmer STP primary treatment discharge more pronounced, since the sediment particles do bind up contaminants, and water problems could occur without the masking effects of high sediment.

Estimates of sedimentation (Method on Page 163 work plan) were based on the Musgrave Soil Loss Predicting Equation since the Universal Soil Loss Equation had not been adopted at this time. The USLE accounts for total rainfall energy for a specific area rather than the rainfall amount; therefore, some checking calculations using some of the USLE should be made to insure the sedimentation data is reasonable and that the Musgrave equation was adequate for this area.

June 16, 1975

Page 2

Mr. Donald C. Bivins

Although the Draft Statement mentions that no facts are known about the insecticide residues in this stream (Page 24), there may be some soil data from surrounding farmland available from USDA. This data could be used to estimate residues in stream bottoms and banks to approximate residues released during disruption of sediments. Since this area is heavily agricultural, pesticide residues should be an important consideration.

Finally, the Statement does not state that there are possible implications pursuant to Section 404 of Public Law 92-500. We would like to point out that if the project is to proceed, appropriate Federal permits may be needed pursuant to the Federal Water Pollution Control Act Amendments of 1972 (FWPCA). Cypress Creek contains "waters of the United States into which the discharge of any pollutant by any person shall be unlawful" under Section 301 (a) FWPCA. The violation of 301 (a) of the FWPCA will occur unless a Federal permit is obtained for the discharge of the pollutant into the main stream. Any discharge of dredged material or of fill material into the wetlands that fills or blocks bypassed portions of the river's natural channels may require a Section 404 permit from the U. S. Army Corps of Engineers. Discharge of pollutants other than dredge material into Cypress Creek may require Section 402 (NPDES) permits from EPA.

Utmost care should be taken to prevent spoil etc. deposited on stream banks from washing or falling back into the stream bank since it may result in the violation of Federal laws.

In light of our review, we have assigned a rating of LO- (lack of objection) to the project and 2 (insufficient information) to the impact statement.

Please furnish us with five copies of the final statement when available. If we can be of further assistance in any way, please let us know.

Sincerely,



David R. Hopkins
Chief, EIS Branch



OFFICE OF URBAN AND FEDERAL AFFAIRS

SUITE 108 • PARKWAY TOWERS BUILDING • NASHVILLE 37219 • 615-741-2714

RAY BLANTON
Governor

October 16, 1975

WASHINGTON BUTLER, JR.
Director

Mr. Donald C. Bivens, State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
561 U. S. Courthouse
Nashville, Tennessee 37203

RE: McNairy - Cypress Creek Watershed
McNairy County, Tennessee

Dear Mr. Bivens:

This is pursuant to our Clearinghouse letter of June 24, 1975 which provided the State's response to the draft EIS and work plan for the subject proposed project.

It is the opinion of this office that adequate clarification has resulted in the interim through various discussions and meetings particularly between officials of the Tennessee Wildlife Resources Agency and the SCS, the most notable meeting occurring on July 2, 1975. The Tennessee Department of Conservation was also represented at that meeting.

Most points raised from the review of the draft EIS and work plan were satisfactorily addressed in the final documents except for minor discrepancies as detailed in the enclosed comments from TWRA.

We appreciate the constructive efforts by officials of the Soil Conservation Service and our own State agencies in resolving this issue, pointing out the effectiveness in adhering to the established review procedures.

We recommend early implementation of this project, and look forward to continuing this same spirit of cooperation in the future.

If this office, as the State Clearinghouse, can be of further assistance in this or any other matter, please do not hesitate to contact me.

Sincerely,

Stephen H. Norris
Stephen H. Norris
Grant Review Coordinator

SHN:mn

Enclosure

II

IIa

July 8, 1975

Mr. Stephen H. Norris
Grant Review Coordinator
Office of Urban and Federal Affairs
Parkway Towers, Suite 103
Nashville, Tennessee 37219

Re: SCS - Cypress Creek, McNairy County Draft EIS

Dear Mr. Norris:

In response to your recent request, the Soil Conservation Service has met with us concerning clarification of questions raised in Larry Safley's letter of June 13, 1975 concerning evaluation of the Cypress Creek - McNairy County Draft EIS. They have adequately explained most points and have agreed to appropriate clarification and elaboration in the final EIS. We are forwarding them a copy of our notes of that meeting in order that they may include these and other points in the preparation of the final EIS.

We appreciate your assistance in this matter.

Sincerely,

Harvey Bray, Director

Robert M. Hatcher

Robert M. Hatcher, Fisheries Environmentalist
Planning & Environmental Resources Division

RMB/ba

cc: *Wilbur Vaughan*
Ray BenKston - SCS



STATE OF TENNESSEE
OFFICE OF URBAN AND FEDERAL AFFAIRS

SUITE 108
PARKWAY TOWERS BUILDING
NASHVILLE 37219

615-741-2714

June 24, 1975

Mr. Donald C. Bivens, State Conservationist
U. S. Department of Agriculture
Soil Conservation Service
561 U. S. Courthouse
Nashville, Tennessee 37203

RE: McNairy - Cypress Creek Watershed
McNairy County, Tennessee

Dear Mr. Bivens:

As the designated State Clearinghouse for Federal development programs and projects under OMB Circular A-95 guidelines, we have conducted a review of the draft environmental impact statement and work plan for the subject proposed project. The watershed project is proposed for implementation under authority of the Watershed Protection and Flood Prevention Act, as amended, and comprises an area of 109,600 acres in McNairy County, Tennessee.

The Tennessee Wildlife Resources Agency, the independent State agency responsible for preserving and maintaining wildlife and related habitat, has submitted commentary which addresses various deficiencies and inadequacies in the draft statement regarding the proposed project's impact in Tennessee. Also enclosed is a brief comment from the Tennessee Department of Transportation and Historical Commission and recommendations from the Tennessee Department of Public Health.

This office highly urges that considerable attention and due consideration be given these enclosed comments and suggestions. Approval of this project by the State of Tennessee is conditional upon a favorable response from the sponsors and documentation and preparation of the final EIS and work plan which are acceptable.

We appreciate the opportunity to review this proposal and respectfully offer the commentary herein in the spirit of cooperation. We, or other reviewing authorities, may wish to comment further at a later time.

Mr. Donald C. Bivens

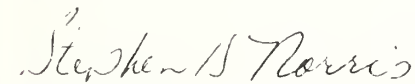
June 24, 1975

Page 2

Direct contact may be made with the Tennessee Wildlife Resources Agency for useful input in resolving and clarifying the numerous points of contention. If this office can be of assistance, please feel free to contact me.

We request ten (10) copies of the final documents upon their completion.

Sincerely,



Stephen H. Norris

Grant Review Coordinator

SHN:mn

Enclosures

cc: Larry Safley, Tennessee Wildlife Resources Agency
Kenneth E. Grant, Soil Conservation Service, Washington, D. C.

MAY 2 RECL



STATE OF TENNESSEE

TENNESSEE HISTORICAL COMMISSION

170 SECOND AVENUE, NORTH
NASHVILLE, TENNESSEE 37201
TELEPHONE (615) 741 2371

LAWRENCE C. HENRY, Executive Director
State Historic Preservation Officer

May 1, 1975

Mr. Stephen H. Norris
Office of Urban and Federal Affairs
Suite 108, Parkway Towers
Nashville, Tennessee 37219

Subject: U.S.D.A: Soil Conservation Service-Forest Service
Draft EIS and Final Work Plan
McNairy-Cypress Creek Watershed

Dear Mr. Norris:

This will acknowledge receipt of the above two documents.

From a review of the information submitted, it does not appear
that this project would affect any plans or priorities of this
agency.

Sincerely,

Herbert L. Harper
Herbert L. Harper

HLH/11



TENNESSEE DEPARTMENT OF TRANSPORTATION

NASHVILLE 37219

RAY BLANTON
GOVERNOR

MAY 19 1975

EDDIE SHAW
COMMISSIONERW. A. GOODWIN
DEPUTY COMMISSIONER

May 15, 1975

Mr. Stephen H. Norris
Grant Review Coordinator
Office of Urban and Federal Affairs
Suite 108 - Parkway Towers Building
Nashville, Tennessee 37219

Dear Mr. Norris:

Subject: U.S.D.A. - Soil Conservation Service,
Forest Service Draft Environment Impact
Statement and Final Work Plan, McNairy-
Cypress Creek Watershed

In accordance with your memorandum dated April 29, 1975, the Department has reviewed the subject Environmental Impact Statement and work plan.

From information contained in the documents, it does not appear that the proposed watershed program will create any conflicts with existing or proposed transportation plans.

We appreciate the opportunity to review this proposal.

Yours very truly,

William C. Wallace, Administrator
Statewide Transportation Planning

WCW/HT/mw

Copy: Mr. E. R. Terrell
Mr. Paul Edens

BUREAU OF AERONAUTICS * BUREAU OF BUSINESS MANAGEMENT * BUREAU OF PLANNING * BUREAU OF HIGHWAYS

JUN 24 1975

June 23, 1975

Mr. Stephen H. Norris
Grant Review Coordinator
Office of Urban and Federal Affairs
Parkway Towers Building, Suite 108
Nashville, Tennessee 37219

Re: The U. S. Department of Agriculture, Soil Conservation Service, Forest Service, Draft Environmental Impact Statement and Final Work Plan, McNairy - Cypress Creek Watershed.

Dear Mr. Norris:

In response to your memorandum of April 29, 1975, staff of our divisions have reviewed the above reference¹ project and following are their comments:

DIVISION OF WATER QUALITY CONTROL

Personnel of the Jackson Office of the Division of Water Quality Control have reviewed the material concerning the above referenced project. We find that we have no major objections, from a water quality standpoint, to the project as presented in the submitted material.

DIVISION OF SANITATION AND SOLID WASTE MANAGEMENT

Housing and Recreation Section

The McNairy-Cypress Creek watershed project does provide for considerable recreational type development which will enhance recreational opportunities for the 10,000 people living in the watershed area as well as people living in the region. Negative environmental impact created by recreational development in the project area would appear to be minimal. Presently there is considerable erosion and flooding in the proposed area. Camp sites and sanitary facilities to serve the recreational areas outlined in the project plan should be approved by the local health department environmental health staff prior to beginning construction of the project. The sponsoring agencies of the McNairy-Cypress Creek Watershed have prepared a good project plan for review.

Mr. Stephen H. Norris
June 23, 1975
Page Two

Vector Control Section

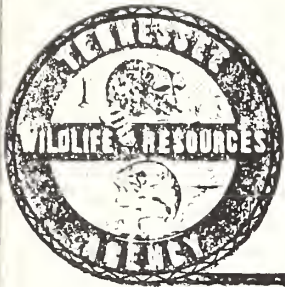
In reference to the statements in the McNairy-Cypress Creek Watershed environmental impact statement regarding vector control requirements in the construction and maintenance of impoundments, all ponds or lakes greater than one acre in size must be permitted with a construction permit and an impoundage and maintenance permit from the Division of Sanitation and Solid Waste Management in the Tennessee Department of Public Health. In order for the proposed impoundments to be permitted, they must meet the structural specifications set forth in the Tennessee Impounded Water Act, Tennessee Code Annotated Sections 53-801 - 53-809.

Thank you for the opportunity to comment on this project.

Very truly yours,

C. Ron Culberson
Supervisor of Promotion and Communication
Bureau of Environmental Health Services

CRC:kst 5-3



TENNESSEE WILDLIFE RESOURCES AGENCY APPENDIX B

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

HARVEY BRAY, Executive Director
ROY H. ANDERSON, Asst. Dir. for
GARY T. MYER, Asst. Dir. for

June 18, 1975

Mr. Stephen H. Norris
Grant Review Coordinator
Office of Urban and Federal Affairs
Suite 108
Parkway Towers Building
Nashville, Tennessee 37219

Re: McNairy - Cypress Creek Watershed, McNairy County, Draft Environmental
Impact Statement

Dear Mr. Norris:

The Tennessee Wildlife Resources Agency has reviewed the above noted environmental impact statement for McNairy-Cypress Creek and submits the following comments.

The subject watershed contains 109,600 acres, all but 400 acres in northeast Mississippi being in Tennessee. The planned works of improvements include 23,410 acres of conservation land treatment, 4.8 miles of channel improvement and 12 floodwater retarding structures, two of the structures being designed for multipurpose use for recreation and one including industrial water supply. The project purpose is to reduce flood damages, erosion and sediment yield, and to provide water in two structures for industrial and recreation uses. A portion of the City of Selmer, located in the flood plain, will be protected from future floodwater monetary losses by flood plain zoning.

TWRA highly recommends farming and land use practices and programs which are within the capabilities of the particular area in question. Encroachment upon the flood plain, particularly that which has a major detrimental impact upon the area's water and soil resources, can not be condoned. Permitting chronic misuse of flood plains frequently results in local demands for federal-state watershed protection programs such as addressed by this impact statement. When the local condition is permitted to deteriorate to the condition of certain areas noted on this watershed, it becomes necessary for large scale corrective programs. TWRA, therefore, supports the intent of the accelerated conservation land treatment measures, that being to stabilize the soils in the watershed and protecting the area's economic-social-recreational base. However, such action is temporary without adequate regulation and/or concern by the local landowners for continued maintenance of the "system".

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The conversion of and/or grass establishment on 1,750 acres of idle or cropland is potentially a serious impact on small game habitat (pages 4 and 13). Such areas provide a type of wildlife food and cover not available in grassland types. This impact can be partially minimized if certain areas (one acre per 10 acres) are maintained in a "protected idle" condition. Similarly, farm ponds, to attain their full potential wildlife value, should be partially or fully fenced and permanent border vegetation (shrubs and grass) established for improved wildlife habitat, including but not limited to that for deer, quail, rabbit, waterfowl and various non-game species.

On page 5, reference is made concerning the change from private to public ownership of 144 acres for structure 4 near Ramer. However, such a ownership change is not stated for Structure 13 near Selmer. What will be the type of ownership for the Selmer lake? Recreational benefits may be more secure with public as opposed to industrial ownership, particularly when the water is to be used for industrial uses.

On page 7, reference is made to the 4.78 miles of stream channel work and that this would amount to three percent of the channel miles in the watershed. On page 24, reference is made to the fact that only about eight miles of Cypress Creek has perennial flow. The map in Appendix B illustrates channel work only within this section of stream flow. The map also indicates that Cypress Creek has perennial flow for approximately 6.45 miles, not eight miles, and that channel work would have an impact on 74 percent of the stream with perennial flow. It must, therefore, be recognized that channel work has potentially a much greater impact on wildlife than generally inferred by the statement. It has been noted that sand pumping will have potentially a less detrimental impact on fish habitat than earlier "channelization" projects.

How much effort will be expended to develop areas in addition to the "1000 acres"? What assurance can be given that the 1000 acres will be developed and maintained in the manner described? What authority will be available to enforce this mitigatory action? (Page 8) Such areas offer an opportunity to "double-crop" by growing crops with the added opportunity to offer some public hunting. Particular reference is made to the management and provision for dove and waterfowl hunting.

Are laws available now for enforcing flood plain zoning or is this action contingent on laws yet to be approved (page 12)? Such legislative action would be favorable to the watershed and in addressing the public demand for current and future flood protection. However, if these laws will not exist in the foreseeable future, no assurance can be given that encroachment will not continue to exist with chronic watershed problems.

What are the "basic recreational facilities" proposed on page 13? Have surveys indicated that "no land use changes in the flood plain" are planned? Will not the 1000 acres of waterfowl mitigatory activity result in significant land use changes?

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One of the points of TWRA concern with watershed projects are references to various activities which would be maintained by landowners and operators at their own expense (page 13-17). What assurance can be given that this maintenance and operation will be continued over the life of the project to the benefit of the watershed and its resources? Without enforceable regulations and periodic monitoring, the total benefit over a long period of time will not be achieved. The reference concerning the Watershed District performing maintenance not done by the landowners would imply that landowner failure to comply with a contractual agreement would be done by the District - is this true?

A more precise time should be proposed in the statement in lieu of "fall" for closure of gates and "by March 1" for opening the gates to dewater the agricultural lands. TWRA would recommend gate closure on October 1 and gate opening no earlier than March 1. Operation of the gates should be the responsibility of S.C.S. or the District. Additionally, this project should include purchase of shorelines around the lakes to ensure public access to them. In any event, public access to the lakes should be encouraged.

Comment is made that the lakes will provide waterfowl foods. TWRA recommends the use of Jap millet for this item. Milo might also be included to provide for waterfowl food. (Page 16)

Specific guidelines are necessary to ensure that the industrial use of water does not seriously detract from the recreational potential for the Selmer lake. Guidelines should include the amount of use and the lower limits of water quality permitted. The City of Ramer should obtain advice and direction from TWRA for fish population management of their lake. (Page 16)

What is the initial source of water noted as providing the base flow of two cfs for Cypress Creek? (Page 24) As noted, this water enters Cypress Creek as "used water" from sewage treatment, laundries, etc.

What is the source of fish population information noted on pages 25 and 26? Appendix D, Fish and Wildlife Service Report is cited; however, the only FWS report cited in Appendix D concerns wetland classifications for the United States. Appendix C is a general input by FWS with no reference to "169 pounds of fish per acre". Could this information have come from the Biology Work Group Report? The Biology Work Group report was for Tuscumbia River and was done in Mississippi. This poundage is probably high for Cypress Creek in Tennessee.

What affect will this project have on the 2800 seasonally flooded acres (wetland type 1) noted on page 26? Will the structural measures replace expected losses of this habitat type?

An affect on the stream fishery is recognized on page 26, but what that affect is has not been discussed. Has the affect been beneficial or detrimental? How?

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The Tennessee Wildlife Resources Commission has recently approved a list of endangered/threatened wildlife for the state. TWRA should be contacted prior to writing the final statement to include those species potentially inhabiting the area of concern. (Page 27)

Is Big Hill Pond the state park referenced on page 27? What are the TWRA and Department of Conservation development plans for Big Hill Pond and Howell's Pond referred to on page 30? How might this proposal affect those plans?

How many farms in the watershed have land in agricultural programs for not planting crops and what is this acreage? (Page 27 - 29) Will this project result in additional farmland?

What is the source for classifying timberlands as noted on page 31? Were these areas not forest land originally and had later been cleared for agricultural crops? How does this evaluation relate to comments of page 32 concerning gully stabilization?

On page 32, reference is made to conservation plans written for 20,000 acres, about 30 percent of the recommended treatment being applied. What assurances can be given that the land treatment recommendations noted on page 33 in this proposal will result in better acceptance by the landowners?

What is the source and authority for information relating to "physical and mental illnesses" from floods larger than 25-year frequency? (Page 41) How many "25-year frequency floods" will this proposal eliminate?

What guarantee can be given that water - related recreation will be substantially increased except that related to the two multipurpose reservoirs? The remaining reservoirs, managed by the local landowner, would not be available for assured public use without special directives and/or assurances (page 41).

Twenty-eight environmental impacts are discussed on pages 42 to 49. TWRA comments are addressed to individual items.

Conservation Land Treatment

- Item 1: Extensive pastureland acreage in one field should be avoided; rather, small scattered fields separated by cropland and field borders would partially replace wildlife habitat losses through conversion and structural works.
- Item 2: Planting of shrubs in field borders would also provide additional "edge".
- Item 3: Idle lands (one acre in 10) are encouraged as part of any conversion to cropland or pasture. Distribution of these protected areas should be scattered throughout the agricultural area.

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- Item 4: Additional information is needed to clarify the table on page 43. For instance, a need is expressed for critical area stabilization, but no reference is shown for acres presently treated, acres to be adequately treated nor acres remaining.
- Item 7: What tree species are to be planted on the "700 acres of idle land or cropland to be planted"? TWRA recommends leaving some den trees and planting those species of value to the local wildlife species. Comment is applicable to items 9, 11 and 13.

Structural Measures

- Item 1: The structural measures will reduce downstream sediment deposits only until the sediment and floodwater retarding pools become completely filled with silt. Their long-term value is dependant upon upstream land stabilization which will prevent the retention pool from becoming filled in with silt and sediment. This will require a high public concern and/or watershed use regulations. It is also recommended that some mast trees be left wherever possible, assuming periodic flooding will not kill them.
- Item 2: There appears to be a disagreement between 227 acres for industrial use noted in this item and information given on pages 5-7. This latter reference notes 52 acres for recreation (Structure 4) and 230 acres for recreational/industrial use (Structure 13). These structures were recognized as mitigation for wildlife losses and, unless so noted, will not attain this recognition when placed in "competition" with industrial uses.
- Item 3: Structures and their retention pools will not by themselves provide "wetland habitat for waterfowl". There will be limited waterfowl foods produced following drawdown unless effort is made to annually seed and fertilize such areas. Birds attempting to roost or rest in reservoirs with bare banks will be subject to increased and substantial predation - the reservoirs would essentially serve as a "trap" to waterfowl frequenting such areas.
- Item 5: Where will the 32 acres be cleared for a sand disposal area? This could be a minor impact unless the area to be so used is in a key wildlife area such as a permanent wetland or swamp area. The spoil area would be best located outside of the flood hazard area and floodplain. Additionally, such an area might be made available for utilization as a sand storage area preliminary to the commercial use of the sand.
(Page 46)

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How will the loss or alteration of 2,265 acres of wildlife habitat be replaced in this project? The installation of 20 floodwater retarding structures, decrease of 7,410 acres of cropland, increased of 3,150 acres of grassland and the conversion of 3,150 acres of idle land to cropland/grassland will not adequately mitigate this loss without special guidelines and concern by the planners, designers, and sponsors of this project. (Page 46)

- Item 7: What will be the frequency of flooding downstream from "a point 3.5 miles above the confluence with Tuscumbia River"? What will be the flooding downstream from the Cypress Creek Watershed? What waterfowl mitigation is planned to replace the seasonally flooded forest land in the downstream portion of the flood plain? Though important, open water in a relatively small reservoir will not replace waterfowl habitat in a flooded forest setting.
- Item 8: Will easements on about 1000 acres include access for public hunting activity? Other than water level controls, will easements result in special crops and/or management of existing crops for the waterfowl during the fall-early spring period?
- Item 9: What wildlife foods will be planted in the 32-acre spoil area and how will they be managed?

Nonstructural Measures

- Item 1: The need for flood plain zoning is evident from references to the flooding of a post office, two schools, 39 homes, 75 businesses, four industries, and a sewage treatment plant.

Economic and Social

- Item 3: What is the source for the noted visitor-days of recreational activity for the two multiuse reservoirs? These use figures appear to be high in view of the information from the State Planning Office which indicates the total McNairy County population projection for 1980 is 21,228 individuals.
- Item 4: The additional recreational opportunities on the 18 single purpose floodwater retarding structures will not be available or will be insignificant unless public access is provided and assured.
- Item 5: What portion of the 230-acre recreation/industrial reservoir does "1,214 acre-feet of industrial water supply" represent? What would the maximum and normal drawdown be as now anticipated? TWRA suggests that severe drawdown during April and May will be highly detrimental to spawning bass.

Nineteen favorable environmental effects are noted on pages 50-52. Comments will be directed to individual effects noted.

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- Item 2: Wildlife habitat will be enhanced if all or part of the water area is fenced to protect vegetative cover bordering the pond from cattle grazing.
- Item 3: What tree species will be planted on the 700 acres of idle or cropland? Earlier it was noted that the idle land would be converted to cropland or pasture. Clarification? TWRA would recommend mast or other food producing species.
- Item 6: What types and species of food and cover will be added to field border plantings?
- Item 7: What assurance can be given to the provision of public access? Some watershed projects have claimed a provision for several thousand recreation days on floodwater retarding structures. However, following construction, the shoreline was posted against any trespassing, an action fully supported by at least one landowner.
- Item 8: The recreational use noted in the statement in the 227 acres of "recreation water" will be too high to permit large populations of waterfowl to concentrate on the lakes. However, the fishing opportunity should be high, especially with reservoir management.
- Item 9: Regulations concerning the industrial use of the Selmer Lake should include the aspect of use and the minimum water quality below which no additional degradation would be permitted.
- Item 11: The quality of waterfowl roosting and resting habitat will depend on water level management and shoreline food and cover vegetation. Water and barren shorelines will not replace the waterfowl habitat lost by decreased acreages of temporary wetland habitat.
- Item 13: What of flooding downstream from the referenced point?
- Item 19: While some recreational opportunities will be increased, others will be decreased or potentially eliminated.

Seven adverse environmental effects are noted on page 53.

- Item 1: Leaving a minimum of one acre of idle land to ten acres (10%) to be converted will minimize this impact.
- Item 2: Forest management involving timber and wildlife concepts will minimize this impact.
- Item 6: The impact of lost fish food (habitat?) can be partially minimized with the placement of stream structures which would result in pools immediately downstream. Such installations would result in better aquatic habitat for fish and fish foods.

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Item 7: Where will the disposal area be located? Limiting stream bank clearing to the north and east side would prevent excessive warming of the water. Saving shade trees on the south and west is encouraged. TWRA also understands that this suggestion may not be possible in the vicinity of the Big Hill Pond area and would not object to variation at this point.

As noted earlier, TWRA looks favorably upon accelerated conservation land treatment measures which adjusts the selection of crops to those suited to the land capability. Such selection should also include those crops and management of benefit to all forms of wildlife. (Alternative 1)

TWRA concurs that a levee system alone will not solve the problems outlined in the statement. (Alternative 2)

Floodwater retarding structures, used in conjunction with accelerated conservation land treatment measures, have the potential for correcting many of the flood problems in this watershed. However, their total value will not be met without assurances for public access for fishing, hunting and other recreational pursuits. Documented evaluation of the results of the combination of activities (reservoirs and land treatment) is encouraged prior to initiating channel work. (Alternative 3)

Flood plain zoning is encouraged to prevent future public demands for additional watershed management programs. Zoning is encouraged throughout the watershed, and should not be limited to various segments.

TWRA concurs with the evaluation (intent) of Alternative 5, no project, as stated.

On August 9, 1974 the Wildlife Resources Agency requested of the Soil Conservation Service the status of a comprehensive study of the Hatchie River Basin, including its relationship to the water regime of West Tennessee, the neighboring states and the Mississippi River Basin. An impact statement was requested for pointing out problems and offering alternatives which would fulfill the needs without destroying unnecessarily environmental values.

SCS responded to this request on August 23, 1974 by noting the need for a study in greater detail than had previously been done. It was noted that SCS did not have sufficient staff to undertake a study on the Hatchie while an active study on the Obion-Forked Deer study was underway. It was further recognized that no new channel work was anticipated in the Hatchie Basin during fiscal year 1975 except for possibly some in Cane Creek and Muddy Creek. No foreseeable channel work in Cypress Creek would be anticipated in the next two or three years which would be after the initiation of SCS plans for a Hatchie Basin study. Since accelerated land treatment measures and flood control structures will reduce erosion, SCS would continue work plans for Cypress Creek.

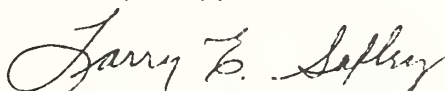
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TWRA concurs with the need for erosion/sediment controls and supports the earlier request for a comprehensive study of the Hatchie River Basin, including the Cypress Creek Watershed. TWRA encourages the initiation of this study prior to commencing structural work such as channel work or floodwater retarding structures. Accelerated land treatments, proposed to reduce further siltation and erosion, are of benefit to the integrity of the Basin and would be generally encouraged.

Thank you for permitting us to review this important project. The preceding comments have been made to point out areas needing further clarification or to suggest additional important information. TWRA will continue to work with SCS and the local sponsors to ensure adequate watershed protection while minimizing potential detrimental impacts on the area's resources.

Sincerely,

Harvey Bray, Director

A handwritten signature in cursive script, reading "Larry E. Safley".

Larry E. Safley, Wildlife Environmentalist
Planning & Environmental Resources Division

LES/ss/bs

cc: Mr. Wilbur Vaughan



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

16 JUN 1975

Mr. Donald C. Bivens
State Conservationist
Soil Conservation Service
561 U. S. Courthouse
Nashville, Tennessee 37203

Dear Mr. Bivens:

This is in response to your letter of 25 April 1975 addressed to Commandant, Coast Guard concerning a draft environmental impact statement for the McNairy-Cypress Creek Watershed, McNairy County, Tennessee.

The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to this project.

The opportunity to review this draft statement is appreciated.

Sincerely,

A handwritten signature in dark ink, appearing to read "R. I. Price", is written over a large, stylized, looped flourish.

R. I. PRICE
Rear Admiral, U. S. Coast Guard
Chief, Office of Marine Environment
and Systems



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

PEP ER 75/438

JUL 8 1975

Dear Mr. Bivens:

Thank you for your letter of April 25, 1975, requesting our review and comment on the watershed work plan and draft environmental statement for the McNairy-Cypress Creek Watershed, McNairy County, Tennessee.

We have reviewed the subject documents from our particular jurisdiction and expertise. Our comments follow, first on the Addendum and Work Plan and then on the draft environmental statement.

Addendum

It is suggested that cultural resources be discussed as a component of the Environmental Quality (EQ) account. The sections on "Measures of Effects" and "Irreversible and Irretrievable Commitments of Resources" should also discuss cultural resources.

The EQ plan should be expanded to include considerations given in compliance with preservation procedures for cultural resources as described in your watershed planning document, "Preparation of Environmental Impact Statement Guidelines" (7 CFR, Part 650).

Watershed Work Plan

Work plan provisions are the same as proposals upon which our previous fish and wildlife reconnaissance report was based, except for stream channel works. The original proposal of 24.6 miles of channel excavation and 6.6 miles of channel clearing and snagging has been reduced to a sand-pumping operation on the lower 4.78 miles of the main stem. The Department endorses this approach.



Recreation Resources

On pages 106 and 117, it is indicated that the average annual use of multiple-purpose structures 4 and 13 would be 80,000 "visitor-days." It would be appropriate to indicate an estimate of the nondiverted, or "new," recreation use that would be generated by the project if, indeed, the total use estimate is made up of both "new" use and use that would be diverted away from existing resources. The recreation benefit evaluation should reflect this recreation use calculation.

Pages 106, 117, and 170 indicate that \$1.50 was assigned to each of the 80,000 "visitor-days" to result in \$120,000 average annual benefits. The 80,000 "visitor-days" figure was derived by summing what has been termed "activity days" (or, "activity occasions"); i.e., fishing, 20,000; boating, 8,000; picnicking, 20,000; camping, 8,800; hiking 8,800; hunting, 4,800; and 9,600 other. Where at least some variety of recreational opportunity is offered at water resource development projects, it is commonly assumed that a "recreation day" is constituted by more than one "activity day," usually in the range of from two to three. Pursuant to "Principles and Standards for Planning Water and Related Land Resources" (page 52) it is the number of "recreation days" to which is assigned a unit dollar value. Using this approach, the "recreation day" estimate would be less than the 80,000 figure and the corresponding benefits would be reduced as well. The work plan and page 48 of the draft statement should be changed to reflect the correct computation of recreation days and corresponding benefits.

Cultural Resources

The work plan has not adequately considered cultural resources. Data should be presented documenting the presence or absence of cultural resources. All areas where land disturbances may occur from implementation of the proposed impoundments should be surveyed by a competent, professional archeologist. Any archeological resources should be described and evaluated for their National Register potential. If they meet the criteria outlined in Title 36 CFR 800.10, they should be nominated to the National Register of Historic Places and compliance with Title 36 CFR 800.4 should be documented.

Certain sections should be expanded to document cultural resource considerations recognized by the agency in the planning process. Cultural resources, as vital aspects of the human environment

should be addressed under "Environmental Considerations." In the section entitled "Alternative Selection" it is stated that project plans were formulated in 1970-71. It is suggested that implementation of these plans without adequate evaluation of watershed resources could result in the inadvertent destruction of non-renewable elements of the human environment. This section should be expanded to show that required considerations, as described above, have been met.

The section on "Land Treatment Measures" (page 77) should acknowledge that technical assistance may also have to be furnished to landowners for preservation or use of cultural resources which may be recognized by professional surveys and evaluations.

Draft Environmental Statement

It is recommended that a Table of Contents be included in the final environmental statement, in order to facilitate the review process.

It is suggested that the proposed construction of 18 water impounding structures be mentioned in the Description of Project Purpose and Action (Summary Sheet, paragraph IV), as two multiple-purpose structures have been mentioned, but the other 18 structures have not.

Planned land-treatment measures are first enumerated in detail on pages 2-3 of the draft environmental statement. It would be advisable to specify whether such structural measures as 40,000 feet of ditches and 115,000 feet of diversions are proposed as Government actions or are proposed for installation by local owners and operators with technical assistance or other encouragement from the sponsoring organizations.

Ground Water Resources

The impacts of the proposed project on ground water resources have not been adequately evaluated. The 20 proposed project impoundments will be located in a very significant recharge area, almost directly upon exposures of the most permeable portions of the important Cretaceous aquifers. Thus, it is necessary to discuss the effects on water levels and artesian

pressures in the project vicinity due to the impoundments and flood retardation measures. Any significant changes anticipated in recharge patterns or in the quality of water should be discussed.

Mineral Resources

Current mineral production in McNairy County consists only of sand and gravel. The proposed action will largely preempt future extraction of such surficial deposits in the project area. The statement should acknowledge that indepth mineral potential is not known and the benefit-cost comparison in the work plan should account for the known mineral losses and recognize potential unknown losses.

Although implementation of the plan should have no significant impact on the supply of minerals in the project area, an evaluation of the effects of mineral preemption should be included in the system of accounts required by the Water Resources Council "Principles and Standards" (work plan addendum, January 1975).

Plant and Animal Resources

The first paragraph of this section is erroneous with reference to a 1963 fishery survey in Cypress Creek. The Biology Work Group's investigation of the watershed in 1965 resulted in a preliminary report by that group which stated that Cypress Creek has a fishery comparable to the Tuscumbia River into which Cypress Creek flows. A fish population study of the Tuscumbia River in 1963 by the Mississippi Game and Fish Commission, et al., was cited which showed 169 pounds per acre. The paragraph should be rewritten to reflect the above.

Also, the Fish and Wildlife Service report is referenced as Appendix D. This should be corrected to read Appendix C.

We believe the draft environmental statement adequately recognizes damages to fish and wildlife habitat and presents beneficial effects in an acceptable manner.

Archeological, Historical and Unique Scenic Resources

The statement does not adequately identify cultural resources nor does it adequately assess the projects' potential environmental impacts on these resources. We believe that compliance

with the Soil Conservation Service's "Preparation of Environmental Impact Statement Guidelines" (7CFR, Part 650) will result in an adequate evaluation of potential impacts upon cultural resources.

The final statement should address the following specific suggestions for adequate consideration of cultural resources.

1. All necessary surveys should be undertaken to determine the presence or absence of cultural resources.
2. Surveys should be conducted in areas of primary impact such as proposed channelization, diking, control structures, land clearing, road construction, etc., and in areas of secondary impact where any action by Federal agencies will affect land surfaces, or actions by private individuals sponsored or assisted by Federal agencies will affect land surface, such as additional clearing of agricultural land as a result of a Federally sponsored channelization project.
3. In coordination with the State Historic Preservation Officer, any resource found in the watershed that is eligible for the National Register of Historic Places should be nominated. Section 106 of the Historic Preservation Act of 1966 then applies.
4. As a result of the completed surveys, adequate data should be prepared and discussed in the statement pertaining to those resources not requiring further professional work, those resources requiring additional work, and steps taken to expedite required preservation activities, in accordance with 36 CFR, Part 800.

The final statement should also discuss the possibility of salvage should cultural resources be discovered during construction. Financing and preparations for salvage are to be worked out in accordance with P.L. 93-291 (Reservoir Salvage Act Amendments).

Recreation

The following comments refer to recreation and are presented according to the format of the statement.

Structural Measures

Included in this section should be a discussion of shoreline access control measures at Structures 4 and 13 in order that

the recreational resources are protected from incompatible development, thereby ensuring maximum public opportunity and enjoyment for the public investment involved. This is critical relative to the small size of the impoundments and the recreational use projected for them. We suggest that these two structures have shoreline controls adopted for them so that public access to the recreational features will be available.

Environmental Setting, Recreational Resources

The final environmental statement should include a discussion of the characteristics of Big Hill Pond State Park which lies at the extreme southwestern end of the watershed. Land for this State Park was acquired through financial assistance from the Land and Water Conservation Fund administered by the Bureau of Outdoor Recreation (Project No. 47-00007). Any anticipated impacts on this park should receive detailed discussion in the section on environmental impact. Full coordination with the administering agency regarding impact identification, mitigation measures, and possible alternative treatments should be evidenced.

Water and Related Land Resource Problems, Recreation Problems

A 1972 update of the Tennessee Statewide Comprehensive Outdoor Recreation Plan has been compiled by the State and should be referenced in addition to the 1969 Plan. It would be appropriate to consult with State recreation planners to assure correct interpretation of the Plan.

Environmental Impacts, Structural Measures

We are very concerned over the effects the industrial water drawdown will have on the recreational opportunity afforded by Structure 13. The draft statement does not discuss this issue. It appears likely that the drawdown and resulting mudflats will significantly affect the quantity and quality of the recreation experience. The final statement should fully disclose all anticipated effects of this operational feature of Structure 13 on public recreation.


Environmental Impacts, Economic and Social

No specific provision for outdoor recreation opportunity has been indicated for the 18 single-purpose structures. The final statement should indicate the nature and extent of the opportunity to be available and under what conditions. For instance, if the

opportunity to be available would be only incidental fishing contingent on landowner permission, then that should be so stated.

We hope these comments will be useful to you in the preparation of the final documents.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Stanley D. Acreman". The signature is fluid and cursive, with the first name "Stanley" being more prominent.

Deputy Assistant

Secretary of the Interior

Mr. Donald C. Bivens
State Conservationist
Soil Conservation Service
Department of Agriculture
561 U.S. Courthouse
Nashville, Tennessee 37203

SOUTHWEST TENNESSEE DEVELOPMENT DISTRICT

Post Office Box 2385

Jackson • Tennessee • 38301

901 • 424-6988

May 6, 1975

Mr. Donald C. Bivens
State Conservationist
Soil Conservation Service
United States Department of Agriculture
561 U. S. Courthouse
Nashville, Tennessee 37203

Dear Mr. Bivens:

Thank you for the Watershed Work Plan for the McNairy-Cypress Creek Watershed and the related Environmental Impact Statement.

At present, we have no comments concerning the Environmental Impact Statement or the Work Plan other than to state that the District supports the Watershed Program and find no conflicts with any existing or proposed regional plans.

Sincerely,


Jerry Chapman A.I.P.
Planning Director

JC:vb



DEPARTMENT OF THE ARMY APPENDIX B
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D.C. 20310

Handwritten: 77 [unclear]
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27 JUN 1975

Honorable Robert W. Long
Assistant Secretary of Agriculture
Washington, D. C. 20250

Control No.

Handwritten: 06 - 02967X
Referred to: SCS

Date: _____

B

JUL 03 1975

Dear Mr. Long:

In compliance with the provisions of Section 5 of Public Law 566, 83d Congress, the State Conservationist, on behalf of the Administrator of the Soil Conservation Service, by letter dated 25 April 1975, requested the views of the Secretary of the Army on the Watershed Work Plan and the Draft Environmental Impact Statement for the McNairy-Cypress Creek Watershed, McNairy County, Tennessee.

We have reviewed the work plan and foresee no conflicts with any projects or current proposals of this Department. The draft environmental impact statement is considered to be generally satisfactory. Specific comments on the report are inclosed.

Sincerely,

Charles R. Ford
Deputy Assistant Secretary of the Army
(Civil Works)

1 Incl (dupl)
As stated

COMMENTS

McNairy-Cypress Creek Watershed Report
Soil Conservation ServiceWatershed Work Plan

The channel is to be excavated as much as 10 feet. The general area is susceptible to erosion and gullyng is mentioned. However, there is no indication of any attempt to prevent tributary erosion due to the entrenched creek.

Environmental Impact Statement

1. Page 4. The sketch that is supposed to be at the top of the page was omitted.
2. Page 11. The sketch of the section through the structure indicates the outlet pipe will be near the top of the channel bank and set back from the side slope. Experience of past performance of this type installation dictates some form of bank protection such as paved ditches or riprap slope protection. This should be clarified. As shown, the slope will continue to erode and endanger the levee.
3. Page 12, 2nd para. This para states that the user is responsible for the water quality standards which would be the entire pool of the impoundment. Actually, the user is only responsible for maintaining standards on his withdrawal. This should be clarified.
4. General.

a. The water quality of the streams should be discussed, especially the two multi-purpose impoundments that are being designated for recreational use. In rural areas, the main water quality parameters that affect recreational use are the total and fecal coliform bacteria counts. This is generally the result of septic tanks and stock pens and limits the water use to secondary water contact, such as fishing and boating. Primary body contact sports will be prohibited. Also, the water quality is of prime interest to industrial users, in particular an industry that would use these waters for cooling or steam generation.

b. A discussion of the ground water quality and availability should be included. The use of ground water obtained from deep wells could be an alternative for industrial use rather than reservoir impoundment.

c. The EIS does not quantify the wildlife resources of the area to be disturbed and upon which the mitigation plan was derived. The effect of the project on the wood duck and bald eagle, for example, is not addressed.

d. There are no figures on induced land clearing resulting from the project presented in the statement and no indication whether this was considered in the mitigation plan.

TCL

... that the future may know the bounties of our past

APPENDIX B



Tennessee Conservation League

1205 8TH AVENUE SOUTH
NASHVILLE, TENNESSEE 37203
615 - 254-7659

July 7, 1975

Donald C. Bivens
State Conservationist
United States Department of Agriculture
Soil Conservation Service
561 U.S. Courthouse
Nashville, Tennessee 37203

Dear Mr. Bivens:

We realize that we are somewhat late in submitting our comments on the McNairy-Cypress Creek Watershed Draft Environmental Impact Statement, but before submitting our comments we wanted to be sure that our interested officers and directors were contacted in reference to our comments.

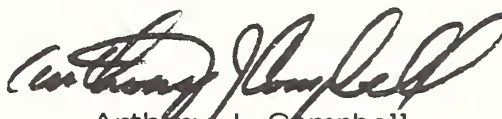
In line with previous correspondence with you and your staff, the Tennessee Conservation League feels that the Draft Environmental Impact Statement for the McNairy-Cypress Creek Watershed project is inadequate. We base this on the fact that the impact statement does not take into consideration the impact of the project on the Hatchie River, of which Cypress Creek is a tributary stream. As you are aware, the Hatchie River is a designated Tennessee Wild and Scenic River and is the only relatively undisturbed river of its type remaining in West Tennessee.

In checking with the Resource Defense Attorney of the National Wildlife Federation, we are advised that there is legal precedent to require this consideration in the Draft Environmental Impact Statement.

The Tennessee Conservation League respectfully requests that the Soil Conservation Service evaluate the environmental impact of this project on the Hatchie River before progressing any further on this project.

If we can be of further assistance on this matter, please feel free to call upon us.

Sincerely,


Anthony J. Campbell
Executive Director

cc: Chester McConnell
Ronello M. Davis
Thomas Kimball

XI

An Affiliate of The National Wildlife Federation

DANIEL A. POOLE
President

L. R. JAHN
Vice-President

APPENDIX B IRA N. GABRIELSON
Board Chairman

L. L. WILLIAMSON
Secretary

WILDLIFE MANAGEMENT INSTITUTE

Dedicated to Wildlife Restoration

709 WIRE BUILDING, 1000 VERMONT AVENUE, WASHINGTON, D. C. 20005 (202) 347-1774

May 29, 1975

Mr. Don Bevins
State Conservationist
Soil Conservation Service
561 U. S. Court House
Nashville, Tennessee 37203

Dear Don:

I appreciate the copy of the Draft Environmental Impact Statement on the McNairy-Cypress Creek Watershed. I have reviewed the statement and found it unacceptable. There are many features described in the statement which would, of course, be very valuable to the individual watershed. You and your staff are to be commended especially for the planned fish and wildlife mitigation features. However my concern is the combined effect of this proposed project coupled with other such projects (already in the planning stage) in the Hatchie River Basin. The draft statement does not adequately consider effects to the entire basin.

Previously I expressed my concern to your office about the Hatchie Basin by letter dated July 10, 1974. It was explained that the tremendous natural resources in this last remaining natural scenic swamp river in Tennessee should be protected. In addition it was requested that an Environmental Impact Statement be prepared for the entire river basin prior to any additional federal projects being conducted.

A letter to me from your office dated July 30, 1974 explained that the Soil Conservation Service shared my concern for the Hatchie River Basin. The letter also indicated that a comprehensive study of the basin would be initiated. It further stated that major watershed activity was not expected to occur before a study was begun. Has a study of the Hatchie River Basin been initiated? Do you not consider the McNairy-Cypress Creek project to be a major federal watershed activity?

I trust you understand the primary reasons for my objections to additional projects in the basin. As stated earlier, any individual project would probably not have serious adverse effects on the entire basin. However piecemeal destruction of many natural resources can certainly occur if a number of projects are slowly continued - one by one.

I appreciate the opportunity to offer these comments.

Sincerely,

Chester A. McConnell

Chester A. McConnell
Southcentral Field Representative





United States Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF SPORT FISHERIES AND WILDLIFE

PEACHTREE-SEVENTH BUILDING

ATLANTA, GEORGIA 30323

May 28, 1970

SCS-Tenn. & Miss. (McNairy-Cypress
Creek)

Mr. J. R. Sasser
State Conservationist, Soil
Conservation Service
Nashville, Tennessee

Dear Mr. Sasser:

The Bureau of Sport Fisheries and Wildlife, in cooperation with the Tennessee Game and Fish Commission, has conducted reconnaissance studies of the McNairy-Cypress Creek Watershed, McNairy County, Tennessee, and Alcorn County, Mississippi. This report on the fish and wildlife resources and project effects on those resources is based upon work plan data provided by your office on April 9, 1970, and is submitted in accordance with Section 12 of the Watershed Protection and Flood Prevention Act (48 Stat. 666, as amended; 16 U.S.C. 1008).

The watershed, 109,850 acres in size, is located in the Coastal Plain physiographic province of southwest Tennessee. Present land use consists of cropland, 28,400 acres; woodland, 65,248 acres; pasture, 5,200 acres; idle critical areas, 4,960 acres; and miscellaneous, 6,042 acres. Cypress Creek is tributary to Tuscumbia River about 10 miles upstream from the Tuscumbia-Hatchie River confluence.

The tentative plan includes provisions for 18 single-purpose structures and 2 multipurpose structures (recreation and recreation-water supply) ranging in size from 5 to 219 acres and totaling 777 acres at permanent pool level, and 1,918 acres at flood pool level. Tentative proposals also include 129,700 linear feet of channel excavation (primarily channel renovation), 35,000 linear feet of channel clearing and snagging, 11.3 miles of onfarm ditching, 100 acres of wildlife food and cover plantings, and other land treatment measures. Predicted land-use changes in the benefited area will result in net increases of 1,000 acres of pasture and 655 acres of miscellaneous, and net decreases of 850 acres of cropland and 805 acres of woodland.

Stream fishery resources as a result of previous channelization are low to negligible in value and confined to the main stem in the lower half

of the watershed. Stream fishing pressure is low. Reworking of the watershed channels will further reduce stream fishery resources. There are three impounded areas in the extreme lower reach of the watershed that contain relatively high value sport fisheries. Two, Howell Pond and Baldwin Pond, are old creek channels closed off by past channeling works. The third, Big Hill Pond, was formed by construction of Southern Railway across the lower end of the watershed. These three areas are open to the public on a fee basis and fishing pressure is rather high for largemouth bass, bluegill, redear sunfish, warmouth bass, crappie, other sunfishes, and catfishes. Farm ponds are also utilized for sport fishing.

Rabbit, squirrel, quail, and dove populations are moderate in abundance and the hunting pressure is also moderate. White-tailed deer are present in low to moderate numbers in the Big Hill Pond area and hunting effort is moderately high. Raccoon and fur bearers are moderate to high and hunting and trapping pressure is the same. Waterfowl use of the entire watershed is low to moderate but rather high in the extreme lower reach of the watershed.

Of primary concern is the anticipated loss of waterfowl and fishery habitat. We understand that measures to prevent and/or offset these losses are being included in the work plan as recommended in the "Preliminary Report of the Biology Work Group" for this watershed. This preliminary report was completed rather early during work plan formulation and recommendations were modified somewhat as work plan proposals were modified. We understand mitigating measures which will be included in the work plan are:

1. Six areas will be leveed with material from channel excavation and equipped with water-level control devices to maintain flooded conditions for waterfowl on at least 1,000 acres. These areas are to remain in their present use, most of which is woodland. In addition, Boles Creek will empty into Baldwin Pond to offset fishery losses which would have resulted from decreased flooding by Cypress Creek. Big Hill Pond will be unaffected by project works.
2. In order to offset the loss of waterfowl habitat in the remainder of the flood plain, all floodwater-retarding structures (except the two multipurpose structures) will be designed to permit a normal summer pool at an elevation equal to the first 50-year sediment volume and a normal winter pool at an elevation equal to the 100-year sediment volume. This will require an additional gate on the riser of the principal spillway. The gate will be closed to allow flooding in the winter to provide additional

area (planted with waterfowl foods) for migratory waterfowl. This flooding differential amounts to 219 acres total and varies on individual structures from 2 to 42 acres.

3. The two multipurpose reservoirs will be stocked and managed, insofar as practical, for fishing. They will be designed with this in mind.
4. As many trees as possible, particularly mast-bearing and large, beautiful trees, will be preserved during channel excavation and snagging operations.

The Bureau endorses the above measures and wishes to commend you and your staff for your efforts. However, in view of the fact that attractive waterfowl habitat is diminishing each year through flood-prevention projects, drainage efforts, and land-use changes, protective measures should be taken at every opportunity. Therefore, this Bureau recommends that spoil be shaped into levees for seasonal flooding wherever feasible for waterfowl usage. Where it is not feasible to flood for waterfowl, we recommend that spoil be stacked, rather than spread, and stabilized with dual purpose vegetation of benefit to wildlife. The spoil in this instance should be shaped with 3 to 1 side slopes with a flat top and not less than 6 feet high.

Experience reveals that permanent pools of the floodwater-retarding structures will be limited in their ability to provide good fishing. In spite of the inherent drawbacks such as large drainage areas in proportion to surface area, sedimentation, rough fish, and aquatic weeds, we believe that an improvement in fishing through management would be justified. Fishery management techniques might include stocking, water-level manipulation for control of established fish populations, reduction of sedimentation and turbidity, and other measures. These practices should be carried out in accord with current policies of the Tennessee Game and Fish Commission.

This report has been reviewed and concurred in by the Tennessee Game and Fish Commission. A copy of Director Stanberry's letter is attached.

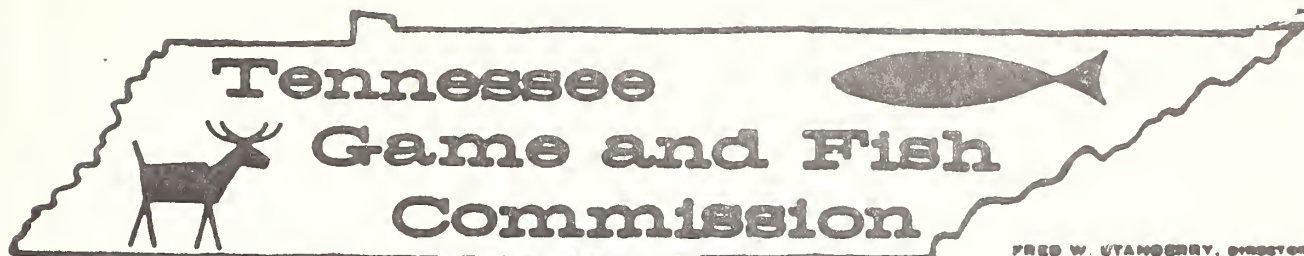
Please keep us informed concerning action taken on recommendations to temper anticipated loss of fish and wildlife habitat. Also please advise us of any changes in project plans so that we can reevaluate the efforts of the project on fish and wildlife and prepare a revised report, if necessary.

The cooperation of your staff is appreciated.

Sincerely yours,



C. Edward Carlson
Regional Director



Ellington Agricultural Center • P. O. Box 9400 • Nashville, Tennessee 37220

FRED W. STANBERRY, DIRECTOR
DAVID M. GOODRICH, ASST. DIR.
HAROLD R. WARVEL, ASST. DIR.

May 19, 1970

Mr. Ernest C. Martin
Assistant Regional Director
U. S. Department of the Interior
Fish and Wildlife Service
Peachtree-Seventh Building
Atlanta, Georgia 30323

Dear Mr. Martin:

This is in reference to the watershed report covering the McNairy-Cypress Creek Watershed Project in McNairy County, Tennessee and Alcorn County, Mississippi.

Please be advised that our Game and Fish Management personnel have reviewed the report and we concur in the report. We appreciate the opportunity to review and make comments.

Sincerely,

Fred W. Stanberry
Fred W. Stanberry, Director
Tennessee Game and Fish Commission

FWS:HEW:bt

cc: Mr. Robert Hatcher
Mr. James Hammond

XIVa

MEMBERS OF COMMISSION

KARL T. SMITH
DR. GREER RICKETSON
RAY STRONG

Bristol
Nashville
Memphis

G. L. LOWE
EDGAR W. EVINS
DR. W. H. BLACKBURN

Chattanooga
Alexandria
Camden

RHEA BROWDER
SMITH HOWARD
JAMES L. BEARLEY

Harriman
Pulaski
Macon

PRELIMINARY REPORT OF THE BIOLOGY WORK GROUP
CYPRESS CREEK WATERSHED
McNAIRY COUNTY, TENNESSEE

APPENDIX B

Study and analyses of the Cypress Creek Watershed in McNairy County, Tennessee was made by biologists of the Tennessee Game and Fish Commission, U.S. Fish and Wildlife Service, and Soil Conservation Service working together and individually. A field investigation of the watershed was conducted March 24, 25, and 26, 1965. The analyses included physical characteristics of the stream and watershed as related to the fish and wildlife resources, relative extent of fish and wildlife species and population, and relative hunting and fishing pressure and success.

The extent and composition of the fish and wildlife resources in this watershed were determined by the Biology Workgroup through interviews with the local Tennessee Game and Fish Commission Officers and through observations and comparisons of this watershed with similar watersheds in West Tennessee.

The present channels of Cypress Creek and tributaries have a fishery comparable to the Tuscumbia River into which the Cypress flows. Fish population study was made by the Mississippi Game and Fish Commission, et. al. in 1963 in the Tuscumbia River channel. This study showed 169 pounds per acre of the following species of fish listed in the order of their abundance: channel catfish, carp, bluegill, largemouth bass, redear sunfish and warmouth. The major part of the stream fishing takes place from Selmer to the junction with the Tuscumbia River.

The other significant fisheries in this watershed are located in the old creek channels closed off by the past channeling work and a body of water created by construction of the railroad. The Mississippi study showed in this type of water 156 pounds per acre of the following species of fish listed in the order of their abundance: channel catfish, bowfin, bluegill, carp, largemouth bass, round sunfish, white crappie, redear sunfish, spotted gar, warmouth, chain pickerel, and yellow bullhead. Three areas of this type of water are managed as fee fishing areas. They are Baldwin's pond located on the left side of Cypress Creek just above the junction with Tuscumbia River, Powell's pond located on the right side, and Big Hill pond located upstream from the railroad.

Work Unit Conservationist's estimates showed 450 man-made ponds in the watershed with 50 of these over 1 acre in size. It is estimated that 150 of the 450 are being managed for fish production in some degree. These ponds are generally stocked with largemouth bass, bluegill, and channel catfish.

There is extensive waterfowl habitat in the floodplain of this watershed. It is estimated by SCS personnel that 15 to 32 percent of the floodplain is wooded or idle. It is also estimated that 30 percent of the floodplain is in soil capability class IVw, which will generally be the wooded areas. Forty percent of the floodplain is in soil capability class IIIw.

Swamp and cottontail rabbits, squirrel, quail, and dove populations are moderate in abundance in the watershed and the hunting pressure is also moderate. The deer population is low to moderate but the hunting pressure is

moderate to high. A hunting season for deer was started in 1959 and is concentrated in the Big Hill Pond area. Raccoon and furbearer population and harvesting pressure are moderate to high. There are some beaver in the lower end of the watershed.

Channel alteration and the ensuing drainage and land clearing will adversely affect the fish and wildlife resources present in the floodplain of this watershed. To mitigate the losses to the fishery and waterfowl resources the following measures are tentatively proposed:

1. Install levees and water control structures in conjunction with the main channel enlargement of Cypress Creek so that Powell's pond, Baldwin pond, and Big Hill pond will be maintained at present levels and also to allow water level fluctuation and drainage when needed.

2. Preserve the lower part of the floodplain of Cypress Creek in its present condition. This would apply from the junction of Muddy Creek and Cypress downstream to the junction with Tuscumbia. A channel for the Caney Creek drainage and Indian Creek drainage will need to be opened through the Cypress floodplain but the spoil should be placed on the north side of the channel. All the other small tributaries and old channels in this area should be equipped with water control structures supplemented with levees so the area can be flooded during the fall and winter months and drained during the summer. Since this area is virtually all in trees now, timber management should be encouraged instead of clearing. These areas can be waterfowl habitat and still produce a timber crop. Most of this area would be included in the proposed State Park.

3. Based on available structure data it is proposed that, in order to mitigate the loss to waterfowl in the remainder of the floodplain, floodwater retarding structures No. 5, 6, 8 and 10 be equipped with water level fluctuating devices. This will allow these sediment pools to be lowered annually 4 feet during June so the dewatered area can produce waterfowl food. The water will be allowed to return to full pool level during the fall and winter months.

In conjunction with the flood prevention program, there will be numerous opportunities to enhance the fish and wildlife resources.

As result of a preliminary evaluation it appears that it would be practical to enlarge structures No. 11, 14, 16, 17, 21, 23, 24, 27, 29, 34, 35, and 37 so that these dams would impound a more manageable body of water for fish production. The increase should be to at least 50 acres of pool surface area thus having not more than a 10:1 drainage area to surface area ratio. In addition, structures No. 11, 34, 35, and 37 should be equipped with a submersed inlet on the principal spillway. All the structures to be used for fish production should be equipped with a second gate so that the water level can be lowered to decrease the surface area by about 50 percent. This is most essential in the pools that will be managed for bass and bluegill.

Structures No. 9, 20, 28, 33 and 36 would need to have the sediment pool somewhat larger than 50 surface acres in order to have a desirable ratio of drainage area to surface area. Structure No. 36 would need a submersed inlet and all these structures should have the extra gate to provide for a controlled draw-down for fish population management.

Characteristics of Structure Sites that Appear Suitable for Enlargement

Structure No.	Drainage Area (Ac.)	Est. Sed. Pool Size (Ac.)	Ratio SP/DA	Min. Surface Area for Fish Mgt. (Ac.)	Ratio SA/DA	Sub. Inlet Needed
9	704	17	1/41	59	1/12	X
11	530	15	1/35	50	1/11	X
14	585	16	1/36	50	1/12	
16	485	14	1/35	50	1/10	
17	552	15	1/36	50	1/11	
20	685	17	1/40	57	1/12	X
21	593	16	1/37	50	1/12	
23	423	13	1/32	50	1/8	
24	396	13	1/30	50	1/8	
27	398	13	1/30	50	1/8	
28	683	17	1/40	57	1/12	X
29	478	14	1/34	50	1/10	
33	708	18	1/39	59	1/12	X
34	545	15	1/36	50	1/11	X
35	460	14	1/33	50	1/9	X
36	752	18	1/42	63	1/12	X
37	576	16	1/36	50	1/12	

The sites selected for fish production should have an intense program of erosion control applied to the watershed. The high sediment yields of the drainage area if not protected will result in extreme turbidity in the impounded water limiting the quality of the fishery. Land treatment measures such as contouring, stripcropping, or terracing and grassed waterways should be used where needed and recommended.

Managing land for mourning dove is another good potential in this watershed. Dove shooting can be a secondary crop on corn fields, sorghum fields, small grain fields, and hay or silage fields such as soybeans and millet. Fields can be planted to a crop such as browntopmillet and the entire crop utilized through selling shooting privileges.

SUMMARY

1. The fishery in Cypress Creek channel extends from Selmer to the junction with Tuscumbia River. The fish species present would be the same as in Tuscumbia River.

2. Other significant fisheries are in the oxbow lakes and a lake created by the railroad fill.

3. Extensive waterfowl habitat is found in the floodplain of Cypress Creek. It is estimated that 15 to 32 percent is wooded or idle.

4. Farm game is moderate in abundance with moderate hunting pressure being exerted.

5. Channel alterations and the ensuing drainage will adversely affect the fish and wildlife resources in the floodplain.

6. Mitigate fishery loss by retaining Powells pond, Baldwins pond, and Big Hill pond.

7. Mitigate waterfowl loss by preserving habitat in floodplain from junction of Muddy Creek downstream to junction with Tuscumbia River.

8. Mitigate waterfowl loss by installing a waterlevel fluctuating device in structures No. 5, 6, 8, and 10.

9. Opportunities for enhancing the fishery resources in the watershed are present. Structures in the smaller drainage areas could be enlarged so that a desirable ratio of the surface area to drainage area could be attained. This step plus intensive erosion control on the drainage area could create many areas of productive and manageable water for fish production.

10. Managing land for dove has a potential in this watershed. This could be a supplementary source of income.

Biology Work Group:

Soil Conservation Service

Floyd Fessler

United States Fish and Wildlife Service

James Nipper

Tennessee Game and Fish Commission

John M. Stubbs

Harold E. Warvel

Solmer, Tennessee
November 12, 1968

Mr. Fred Stanberry, Director
Tenn. Game & Fish Commission
Doctors Building
Nashville, Tn

Dear Mr. Stanberry?

I attended the Hatchie River meeting in Bolivar November 7. Sorry your department was not represented. A Committee of one from each county was appointed to work with the Planning Party and make recommendations. It seems to me from hearing Colonel Williams that the Corp of Engineers could be short of funds for this project.

I asked the group if we could get some temporary relief from Cypress Creek Drainage Canal which runs through our John Howell property. There is a drift approximately one mile long. The water level is the same as our John Howell lake. Therefore, it is destroying our fishing especially after any kind of rain. Also, it is spreading all over the bottom, killing the green timber as well as flooding some good private farm land. It is my understanding from the local Soil Conservation men that the farmers have some funds as well as labor to help clean out this ditch. Since this affects both Game & Fish, I wonder if you would ask Hudson and Roy to look into the possibility of cleaning out this section of the creek.

Although I am not officially connected with Game & Fish, I am just as interested and willing to help whenever possible. Give each department my personal regards.

Respectfully yours,

Travis McNatt

Travis McNatt

cc: Joseph R. Sasser
Soil Conservation Serv.
Nashville, Tn

P.S. I just finished collecting \$215.00 for Ducks Unlimited.

561 U. S. Courthouse, Nashville, Tennessee 37203

April 16, 1973

Mr. Mack Pritchard, Director
Division of Archeology
Tennessee Department of Conservation
2611 West End Avenue
Nashville, Tennessee 37203

Dear Mr. Pritchard:

Enclosed are two copies of the watershed work plan for Cypress Creek Watershed in McNairy County. This plan was prepared under the authority of Public Law 566 by the McNairy-Cypress Creek Watershed District and other sponsors.

According to the procedure outlined in our letter of March 6, we are requesting your review of this plan and your comments in regard to items of archeological significance.

Sincerely,

Paul M. Howard
State Conservationist

Enclosures

bcc: D. M. Treadway
B. M. Johnson

561 U. S. Courthouse, Nashville, Tennessee 37203

March 6, 1973

Mr. Mack Pritchard, Director
Division of Archology
Tennessee Department of Conservation
2611 West End Avenue
Nashville, Tennessee 37203

Dear Mr. Pritchard:

Sometime ago the Regional Director, National Park Service, of Richmond, Virginia, asked us to check with the Tennessee Historical Commission regarding the effect Soil Conservation Service watershed projects might have on sites having historical, architectural, archeological, or cultural significance. Accordingly, we arranged with Dr. Sam Smith and Dr. Wilmon Droze to send copies of each draft watershed work plan we prepare to the Tennessee Historical Commission for review and comment. Their procedure was to review the draft plan for historical significance, and they arranged with Memphis State University to review the archeological effects of watershed projects.

However, since Tennessee now has a Department of Archeology, we think it would be fitting for you to review the draft watershed plans for the archeological facet. I understand that Mr. Dwight Treadway and Mr. Ray Bankston have been working with you in reviewing draft watershed plans such as Hurricane Creek in Hemphreys County and Red Boiling Springs in Macon County.

It is our continuing intent to carefully consider all archeological and historic values of significance in all of the Soil Conservation Service programs. Therefore, we would appreciate your reviewing the attached watershed plan of Bogota Watershed in Obion and Dyer Counties and giving us your comments as to archeological significance of things that may exist in the watershed area. If you have questions about this proposed watershed project, please feel free to contact Mr. Dwight Treadway at 749-5873 or Mr. Ray Bankston at the same number.

To expedite your review of the plan, you may want to refer to the project map that is on the last page in the back of the plan and the description of the watershed that starts on page 4.

Mr. Mack Pritchard:

As we continue working together, we would propose that we develop a listing of steps for your information so that we will be able to keep you more abreast of our planning activities in the watershed program.

Sincerely,

Paul M. Howard
State Conservationist

Attachment

cc: W. R. Hurst, Jr.
Paul M. Howard

DMTreadway:dch

TENNESSEE STATE LIBRARY AND ARCHIVES

NASHVILLE, TENNESSEE 37219

September 14, 1970

Mr. J. R. Sasser
 State Conservationist
 United States Department of Agriculture
 Soil Conservation Service
 561 U. S. Courthouse
 Nashville, Tennessee 37203

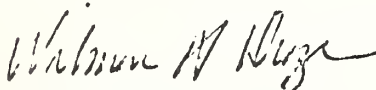
Dear Mr. Sasser:

I requested Mr. Stephen S. Lawrence, Executive Director of the State Historical Commission, to review the draft plan for McNair - Cypress Creek Watershed.

Mr. Lawrence informs me that the project does not conflict with any planning for historic preservation of sites or structures within the flood water retarding structures. It is generally believed that these projects will cover some historical archaeological resources; however, this is unavoidable.

I would recommend that the new Division of Archaeology of the Department of Conservation be informed of your proposed project.

Sincerely yours,



Wilmon H. Droze
 State Librarian and Archivist

WHD:bd

XVIIa

-17-70

Pho. copy to Treadway with note for him to establish contact with the Divis. of Arch.

9-20-70 ... talking stage. No such outfit in Dept. of Conservation ^{NRH}

U.S. Courthouse, Nashville, Tennessee 37233

August 5, 1976

Dr. Wilmon H. Droze, Chairman
Tennessee Historical Commission
State Library and Archives Building
Nashville, Tennessee 37219

Dear Dr. Droze:

Sometime ago, the Regional Director, National Park Service, Richmond, Virginia, asked us to check with you regarding the effect Soil Conservation Service watershed projects might have on sites having historical, architectural, archeological, or cultural significance in compliance with the National Historic Preservation Act of 1966. Accordingly, we arranged with Dr. Sam Smith last year to send copies of each draft watershed work plan we prepare for your review and comments.

Attached are two copies of the draft plan for McNairy-Cypress Creek Watershed in McNairy County, Tennessee. I would suggest that for a brief review of the plan, you refer to the "Summary", pages 1-4, and to the Project Map in the back of the plan which shows the locations of the proposed dams. You will probably be interested, also, in the "Description of the Watershed" starting on page 5. This part of the plan contains a section on Historical Data.

We would appreciate receiving your comments on this draft plan at your convenience. If you have any questions, please call Mr. Dwight Treadway at 242-8321, Ext. 5873.

Sincerely,

J. R. Sasser
State Conservationist

Attachments - 2

cc: D. M. Treadway

- (1) All information and data, except as otherwise noted by reference to source, was collected in the field during watershed planning investigations by the U. S. Department of Agriculture.
- (2) U. S. Department of Agriculture, Soil Conservation Service. 1970. Atlas of River Basins of the United States, 82 maps.
- (3) U. S. Department of Commerce, Bureau of Census, Social and Economics Statistics Administration, Agricultural Census. 1964. Vol 1 part 31; 1959 Vol. 1 part 31; 1954 Vol. 1 part 20; 1969 Vol. 1 part 31.
- (4) Cushing, E. M., E. H. Boswell, and R. L. Hosman. 1964. General Geology of the Mississippi Embayment; Water Resources of the Mississippi Embayment. U. S. Geological Survey. Professional Paper 448-B. 28 pp.
- (5) U. S. Department of Agriculture. 1941. Yearbook of Agriculture Climate and Man, pp. 1119-1128.
- (6) Floyd, R. J. 1965. Tennessee Department of Conservation, Division of Geology, Bulletin 66. 187 pp.

Whitlach, G. I. 1940. Tennessee Department of Conservation, Division of Geology, Bulletin 49. 187 pp.

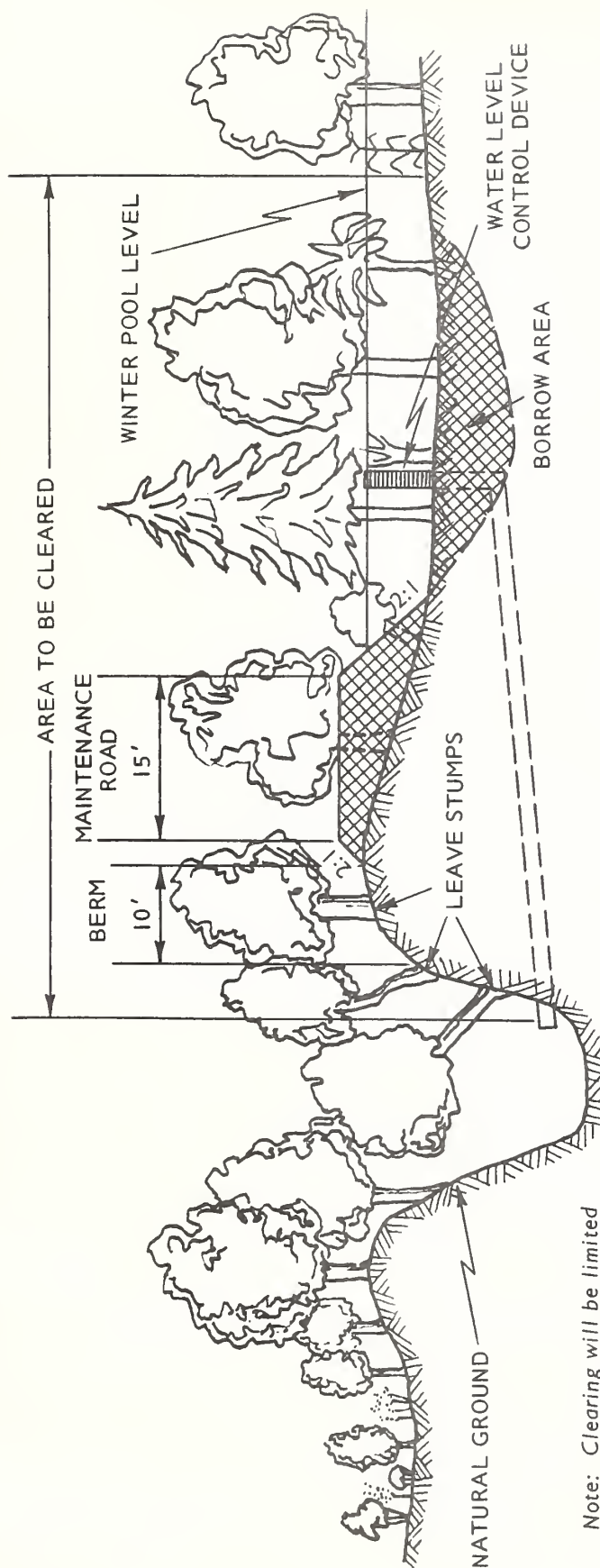
- (7) _____, E. H. Boswell, R. L. Hosman, H. G. Jeffrey. 1968. Quaternary Aquifers in the Mississippi Embayment; Water Resources of the Mississippi Embayment. U. S. Geological Survey. Professional Paper 448-E. 15 pp.

Hosman, R. L., A. T. Long, T. I. Lambert. 1968. Tertiary Aquifers in the Mississippi Embayment; Water Resources of the Mississippi Embayment. U. S. Geological Survey. Professional Paper 448-D. 28 pp.

Boswell, E. H., G. K. Moore, D. M. MacCary, H. G. Jeffrey. 1965. Cretaceous Aquifers in the Mississippi Embayment; Water Resources of the Mississippi Embayment. U. S. Geological Survey. Professional Paper 448-C. 37 pp.

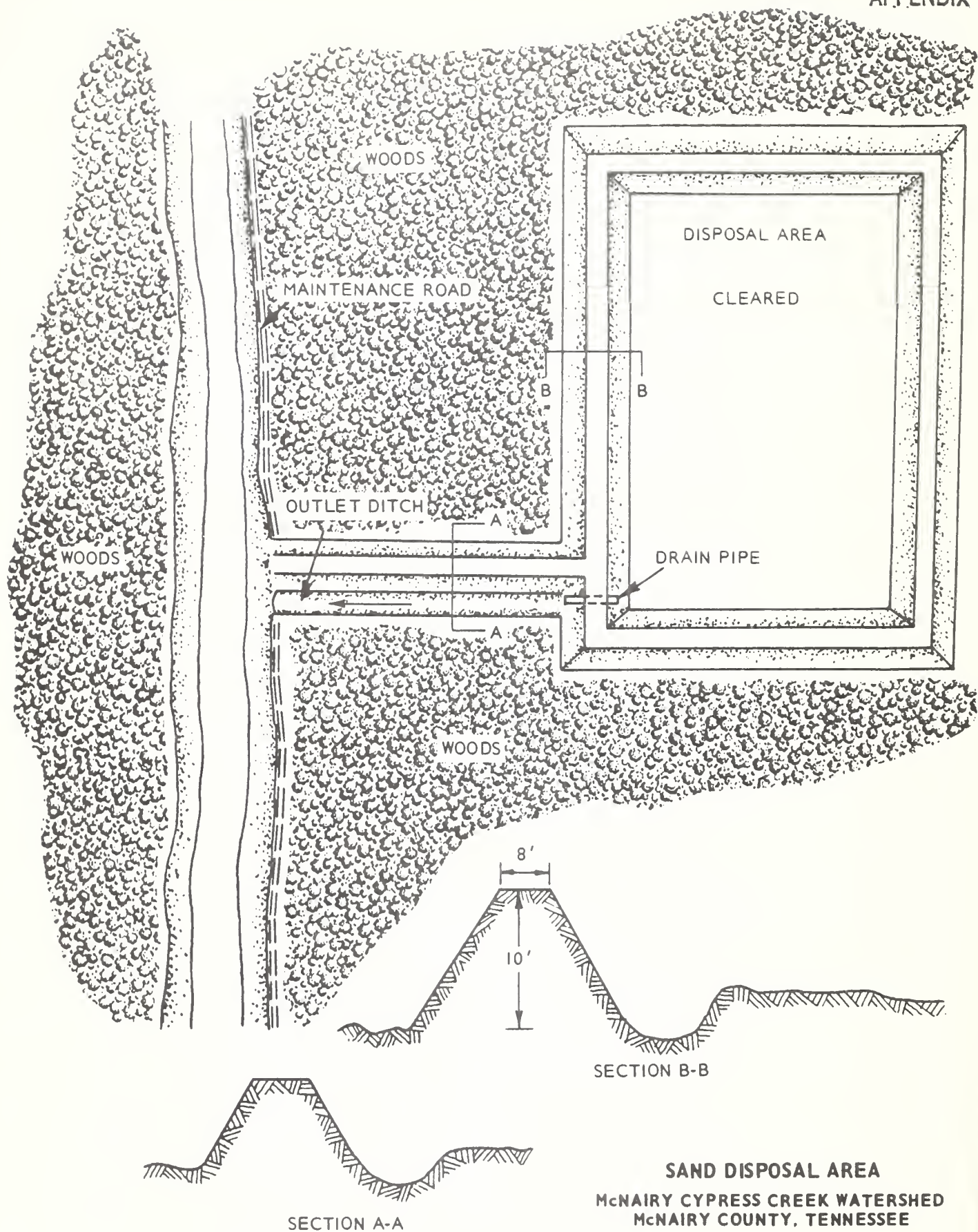
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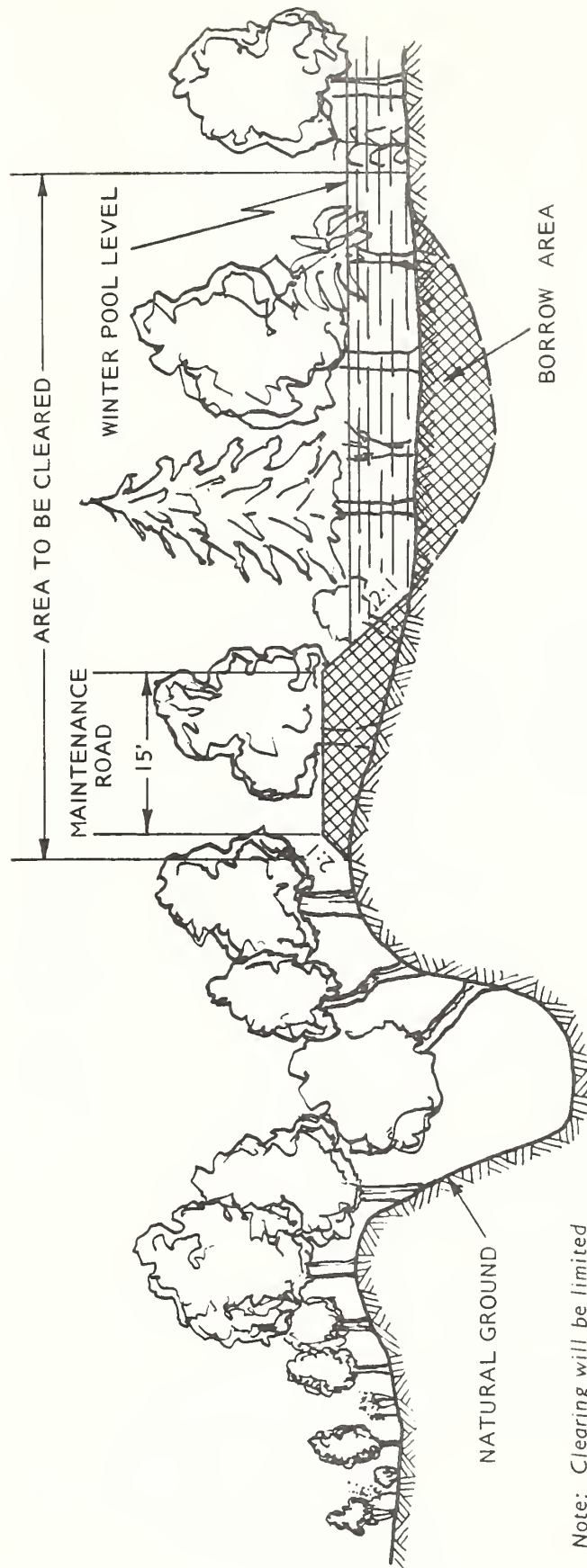
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- (12) Tennessee Department of Conservation, Division of Planning and Development. 1972. Tennessee Statewide Comprehensive Outdoor Recreation Plan.
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Note: Clearing will be limited to that necessary to obtain borrow materials, construct the levees and install the water level control devices.

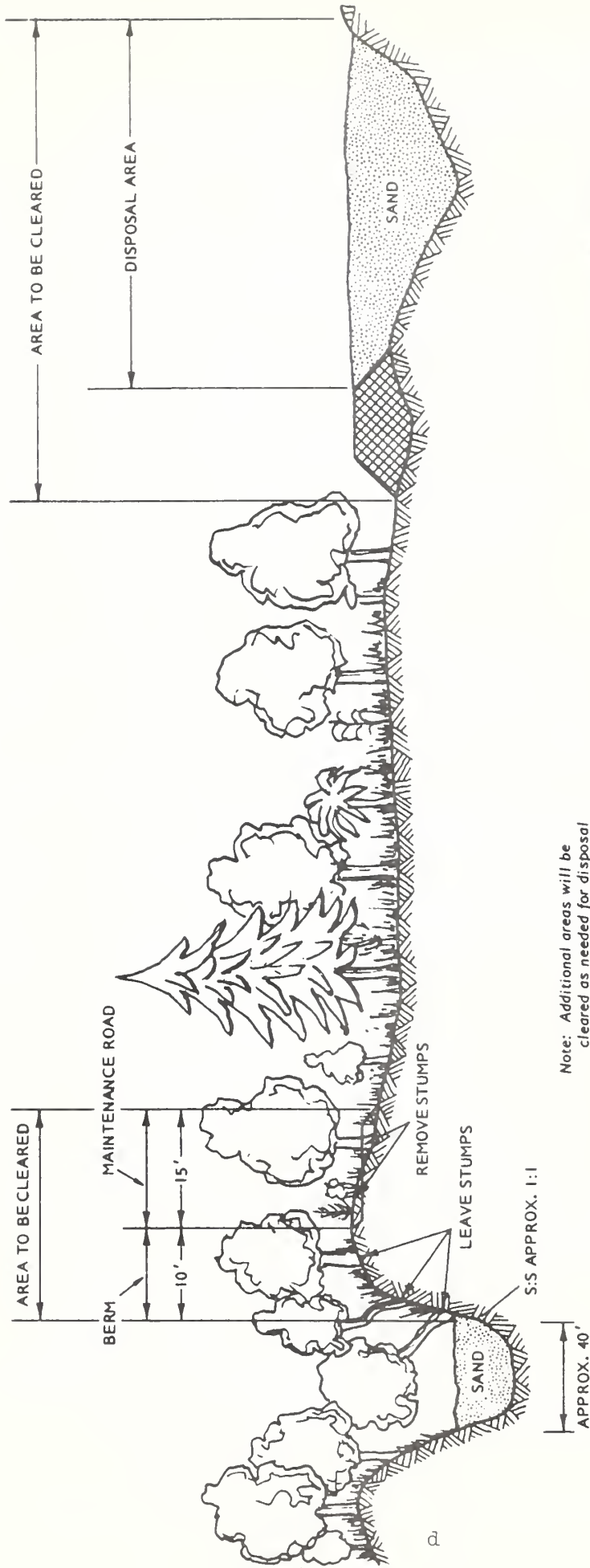
MITIGATING MEASURES WITH WATER LEVEL CONTROL DEVICE McNAIRY CYPRESS CREEK WATERSHED McNAIRY COUNTY, TENNESSEE





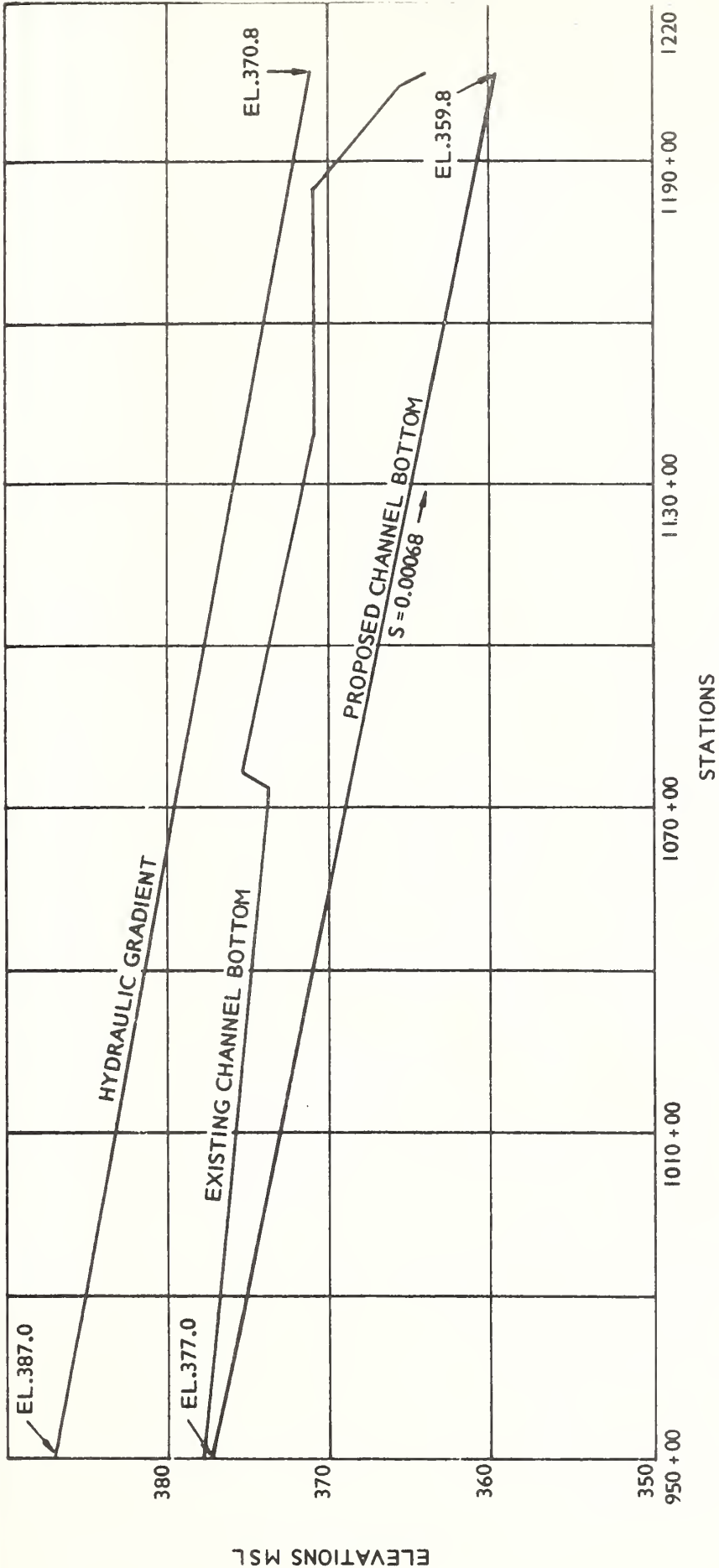
Note: Clearing will be limited to that necessary to obtain borrow materials, construct the levees and install the water level control devices.

MITIGATING MEASURES
TYPICAL SECTION LATERALS
MCNAIRY CYPRESS CREEK WATERSHED
MCNAIRY COUNTY, TENNESSEE



Note: Additional areas will be cleared as needed for disposal of logs, trees and debris.

TYPICAL SECTION MAIN CHANNEL & SAND DISPOSAL AREA McNAIRY CYPRESS CREEK WATERSHED McNAIRY COUNTY, TENNESSEE



CHANNEL PROFILE **McNAIRY-CYPRESS CREEK WATERSHED** **McNAIRY COUNTY, TENNESSEE**

U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, Nashville, Tennessee

USDA-SCS-PORT WORTH, TEX. 1974

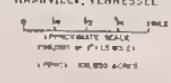
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PROJECT MAP

MCNAIRY - CYPRESS CREEK WATERSHED

MCNAIRY COUNTY
TENNESSEE
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
KANSASVILLE, TENNESSEE



LEGEND

- Paved Roads
- Improved Roads
- Unimproved Roads
- Federal Highway Numbers
- State Highway Numbers
- Drainage
- Watershed Boundary
- Benefited Area
- Channel Work For Flood Prevention
- Valley Section & Number
- Levee & Water Control Device
- Drainage Area Controlled by Structures
- Structure Number
- Floodwater Retarding Structure (No 4 Recreation & Flood Prevention)
- Multiple Purpose Structure (No 13 Industrial Water, Recreation & Flood Prevention)
- R Recreation
- I Industrial Water Supply
- Recreation Area

Valley Section	Drainage Area Acres
1	1726
2	6135
3	1854
4	5850
5	1534
6	1610
7	2763
8	555
9	979
10	836
11	621
12	307
13	868
14	670
15	443
16	1533
17	1004
18	1660
19	851
20	155

